REPORT

ON THE

OPERATIONS OF THE AGRICULTURAL DEPARTMENT,

MADRAS PRESIDENCY,

FOR THE OFFICIAL YEAR

1886-87.

MADRAS:
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1888.

PROCEEDINGS OF THE BOARD OF REVENUE
(Revenue Settlement, Land Records and Agriculture).

Read—the following G.O., dated 25th October 1887, Nos. 1012, 1012 A, Revenue :—

Read—the following Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 1st September 1887, No. 310 :—

Resolution—dated 1st September 1887, No. 310.

The Board resolve to submit their report on the operations of the Agricultural Department for the past official year 1886-87.

2. There were several changes in the *personnel* of the department. Mr. Glenny was Acting Director of Revenue Settlement and Agriculture from the beginning of the year up to 26th July 1886, when he was relieved by Mr. Price, who was, however, on special duty throughout the month of September, drawing up a note as to the necessity of furthering the extension of protective railways for the Finance Committee. During this period, Mr. Grose, Acting Third Member of the Board of Revenue, was in charge of the Director's office. On the 1st October, Mr. Price resumed charge, but left the department on the 21st idem, on his appointment as Acting Secretary to Government in the Revenue Department. For about three weeks, Mr. Whiteside, Third Member of the Board of Revenue, was in charge. From the 16th November to the end of the year, Mr. Grose held charge for some time as Acting Third Member of the Board of Revenue, and subsequently as Acting Director of Revenue Settlement and Agriculture.

3. The principal events of the year are noticed fully in the accompanying reports of the Assistant Commissioner of Land Records and Agriculture and of the Inspector of Cattle Diseases.

I.—Organization and Maintenance of Village Records.

4. The village records, with the exception, perhaps, of the register of agricultural stock, are, on the whole, fairly well kept, and the Board see no ground for the opinion, more than once hazarded by the Assistant Commissioner, that they are not worth the paper on which they are written. Referring to crop statistics, Mr. Benson states that these are "now not checked in the field and not tabulated in any definite form." The Board observe that, in his report for the preceding year, Mr. Benson himself admitted that "with certain reservations" the cropping return "will give us some general ideas not far from the truth." Full instructions for the preparation of these and other returns have been issued by the Board of Revenue from time to time, and they have now been embodied in the revised manual of accounts. With respect to the record of irrigation, Mr. Benson also admits that it is "now fairly complete," but he thinks that it is "altogether wanting as regards subterraneous supply." The existing accounts are not intended to show wells, ponds, &c., which are used solely for drinking purposes, but they contain accurate records of all subterranean sources which are used for purposes of irrigation.

5. The revised manual of accounts has been introduced in the current year. Its introduction last year was unfortunately delayed owing partly to the time consumed in translation into the vernaculars and partly to the necessity for a reference to the Controller-General regarding certain changes introduced by the manual, which involved an alteration in the form of treasury account.

6. One very important change effected by the new manual is the simplification of the village cash accounts. Under the old system every payment made by each proprietor was apportioned between ryotwar, quit-rent and other numerous items of miscellaneous revenue and land and village cesses. The distribution entailed enormous

labor on the village accountants and was unnecessary, as the object aimed at could be secured by a more simple process. The collections will, in future, be lumped under one head, to be called "Land Revenue and cesses," and eventually distributed between the several heads when the irrecoverable arrears are disposed of at the end of the year. In other words, instead of distributing the collections as received, or daily and even hourly, the irrecoverable arrears, which are small, will be distributed with reference to the demand of the several items payable by each individual, so that by deducting the irrecoverable arrears from the demand which will be determined in detail as at present, the collections for the year can be easily ascertained for such items as it may be deemed necessary to record separately in the accounts. Pending final adjustments between the several heads of revenue which cannot be effected before the following year, the requirements of the cesses will be met by a provisional credit to them to the extent, say, of about 95 per cent. of their demand.

7. The change above described will, it is expected, very considerably reduce the work of the village accountants and thereby enable them to devote more attention to the correct preparation of the other returns. At present, as a body, they are very heavily overworked, and it is no wonder that mistakes are occasionally made which would otherwise be avoided.

8. The agency for the supervision of the village record is at present numerically weak and is inadequately remunerated. Proposals for increasing the number and pay of the revenue inspectors have been under the consideration of Government for several years and are now in a fair way of being carried out.

9. In paragraph 11 of the Director's report for 1885-86, it was stated that a Survey test had been laid down for the revenue inspectors. From April next no persons will be appointed as revenue inspectors and no persons now holding that appointment will be promoted to higher grades, unless they pass the Revenue test Lower Grade and the prescribed Survey test. The number of Revenue Inspectors who have passed in survey that are now employed in the several districts is as follows:—

Ganjam	5	Tinnevelly	4
Godávari	6	Coimbatore	16
Nellore	10	Nilgiris	1
Bellary	17	Salem	8
Kurnool	11	South Canara	1
Chingleput	14		
North Arcot	8	Total ...	117
South Arcot	16		

10. An elementary test will shortly be prescribed for all appointments to the post of village officers, and patwaries or curnams will also be examined in surveying and the village manual.

II.—Analysis of Districts with reference to security from Famine.

11. Mr. Benson and his inspectors have completed the examination of the Kurnool district and have divided it into agricultural tracts with reference to soil, rainfall, &c. It remains now to tabulate the statistics for these tracts and to compile the analysis. The Government of India are, however, of opinion that the tract-plan, on which the work has been carried out, is too elaborate, and that it should be abandoned, the analysis being done through the agency of the ordinary revenue establishments and according to the existing administrative divisions. It is intended, however, that the analysis of the Kurnool district, on which much time and money have been spent, should be completed according to the tract-plan. The tractwar-lists have been printed since the close of the year and forwarded to the Collector with forms for the tabulation of the statistics.

III.—System of collection of Revenue and Rental in precarious Tracts.

12. The question of kistbandi or land-revenue instalments, referred to in paragraph 18 of the last report, was finally disposed of by Government in November 1886. It has been decided that there shall not be

G.O., dated 24th November 1886, No. 1033.

more than four kists in each district and that no kist shall be fixed earlier than December or later than May. As the same instalments may not be found suitable for a whole district, Collectors have been authorized to propose separate kists for groups of taluks or even for a single taluk if necessary, the main object to be borne in mind being that the cultivator should be allowed sufficient time to reap his produce and sell it to the best advantage before he is called on to pay any portion of the Government demand.

IV.—Measures of protection.

13. *Fodder and Fuel Reserves.*—There were 1,628 square miles of reserved forests and 6,733 square miles of reserved lands in the Presidency on the 31st March 1886. During the year under report, 684 square miles of forests were constituted reserved forests and 760 square miles were made reserved lands.

14. *Reclamation of Sandy Waste.*—Nothing has been done either by the Forest or the Salt Department in the direction of finding indigenous salt-bush plants in the different parts of the Presidency.

15. *Edible Cactus.*—Plants of the Maltese *edible cactus* were distributed last year for experiment to the marginally-noted districts. The plants are reported to be thriving everywhere except in Salem, Madras and South Arcot. In the first-named district, on account of a change in the *personnel* of the District Forest-officer, the plants were neglected and no trace of them is now to be found. In the other two districts, only a few of the plants are thriving.

1. Nellore.	8. South Arcot.
2. Cuddapah.	9. Tanjore.
3. Anantapur.	10. Tinnevelly.
4. Bellary.	11. Salem.
5. Kurnool.	12. Malabar.
6. North Arcot.	13. Madras.
7. Chinglepet.	

16. *Diversified cropping.*—The lands reported to be available in the Kistna and Godávari districts for experiments in this direction were inspected by an agricultural inspector, and one block was reported to be fit for the purpose, but having regard to the expense likely to be incurred and to the probability that no commensurate results would follow, and seeing also that Mr. Benson's services were required for other more important work, the Government decided that the experiment should be abandoned for the present.

17. *Communications.*—It was expected that the portion of the Bellary-Kistna State Railway from Guntakal to Nandyál, a distance of 90 miles, would be open for public traffic by the end of the year, but was not. It has, however, been opened from the 11th July 1887. A railway from Tirupati in the North Arcot to Nellore has been completed, but has not been opened to traffic yet. A line from Bezváda to the Nizam's frontier is under construction and when completed will connect the Singareni coal fields with the Bellary-Kistna State Railway and the cannal systems of this Presidency. There are several other lines under survey which when taken up and completed will serve to protect the country from the effects of famine. No irrigation projects were sanctioned or completed during the year under report.

18. *Minor Irrigation Works.*—The year's allotment for the upkeep of minor irrigation works was Rs. 2,75,000. The actual expenditure was Rs. 2,60,000, or nearly 95 per cent.

19. *Agricultural Advances.*—The amount of loans granted under the Land Improvement Loans Act was Rs. 7,472 and that of advances under the Agriculturists' Loans Act was Rs. 17,225, total Rs. 24,697. The bulk of the advances was made in Ganjam (Rs. 12,358), Anantapur (Rs. 4,767), and Kurnool (Rs. 3,321).

20. *Native Arts and Manufactures.*—Mr. Havell, the Superintendent of the School of Arts, visited all important seats of arts and industries in the Cuddapah, Kurnool, Bellary, and Anantapur districts towards the close of the year, and submitted a report which has been published recently. As regards cotton-weaving, he found that a considerable industry is being carried on in colored cloths for female wear in the Bellary and Anantapur districts, and that fine white cloths of superior quality and well woven and having brocaded ends are made at Pullampet in the Cuddapah district. The cotton carpets made of country thread at Cumbum were well designed and good

in color, though rather coarsely woven. At Bellary, there was one family making carpets, the design and execution of which are good. There were over 300 families employed in carpet making at Adóni and Kurnool, but the best carpets are spoilt by the glaring colors of the European thread used by them. Carpets of large size are made to order and when native dyes are used the colors are said to be "pleasing and fairly permanent." Silk cloths are made in some places in the Kurnool, Bellary and Anantapur districts, chiefly at Dharmavaram in Anantapur and Kampli in Bellary. The patterns are good, but the effect is generally spoilt by the use of crude imported green, purple or yellow. The more harmonious country green and yellow dyes are rarely used, except when specially ordered. The industry, however, is in a very depressed condition. In wood-carving, there are a few good workmen at Adóni and Kampli. In design the Adóni carving is much the best, but the Kampli workmen are rather better carvers. Very fine lacquer-work is done by two families, on trays, fans, boxes, &c., at Nandyál and Banganapalle in the Kurnool district. Mr. Havell thinks that it is equal, if not superior, to any other Indian lacquer, and adds :—"This is a very effective and comparatively inexpensive form of decoration, which, if brought into notice and skilfully adapted to furniture and interior decoration, might become popular." The Nossum lacquer-work in the same district is similar in style, but much inferior both in design and execution.

V.—Agricultural Experiments including Farms.

21. The only Government farm, which was the one at Saidápet, having been closed in September 1885, Government have now no direct connection with any farm.

22. *Private Farms.*—The condition of the Madura and Karúr farms is noticed in detail in Mr. Benson's report, which is appended to these Proceedings. Mr. Benson considers that the Madura farm was not well managed during the year, but having regard to the very unfavorable character of the season and the difficulties with which the managers had to contend, the Board think that the management of the farm cannot be considered to have been altogether unsatisfactory. Several interesting experiments were conducted at this farm in shade-drying tobacco, and the feeding of dairy cattle and demonstrations of the Beheea sugar mills and other improved implements were also held at some of the principal festivals. The Karúr farm was inspected by Mr. Benson in June 1886 and appeared to be making progress, and the condition of the stock kept on the farm was fairly good.

23. *Exhibitions of Ploughs, &c.*—Until recently it was attempted to encourage the introduction of improved agricultural implements by ploughing matches and plough-trials. In the year under report, however, it was decided to conduct a sort of travelling show in the South Arcot, Tanjore, Trichinopoly, Madura and Tinnevelly districts. A show party accordingly started in the month of July 1886 under the supervision of Mr. Benson, assisted by Mr. Sami Iyengar (a student of the Agricultural College, who did excellent work in this direction in the preceding year), and visited several of the important towns and villages in these districts, where they exhibited selected implements at work before large crowds of people. The results of the show were so satisfactory (about 300 ploughs having been sold by Messrs. Massey and Co. during the two months the show lasted) that Government directed that similar travelling shows should in future be held systematically and that ploughing matches and plough-trials should be given up. Arrangements have accordingly been made for a show to be held in the current year in the Coimbatore, Salem, North Arcot, and the Ceded districts.

24. In this connection Mr. Benson apprehends that the real difficulty in arranging for making such shows permanent is, in obtaining a suitable person to put in charge of them. Considering the success which attended the unaided efforts of Mr. Sami Iyengar in Tinnevelly, while he was yet a student of the Agricultural College, the Board think there ought to be difficulty in training some of the agricultural inspectors, now working under Mr. Benson, to take charge of the shows.

25. The Board have recently issued a circular to the Collectors of the districts visited by the travelling show party to find out whether the improved ploughs sold by Messrs. Massey and Co. are being used by the ryots and what defects, if any, have been detected. Two Collectors have replied to this requisition and their reports

are, on the whole, encouraging. But, as pointed out by Mr. Benson, the chief difficulty in the way of introducing improved implements into this country is that of repairing them when they get out of order, as the village blacksmith is unable to set them right. This question has been under consideration for some time. Mr. Price recommended that a trained blacksmith should be entertained and sent out with the officer in charge of the travelling show to repair such ploughs as may have got out of order and to teach the village blacksmith how to do the work. Government, however, did not approve of this proposal. In the mean time it was thought that, if the loan of the services of one of Messrs. Massey and Co.'s trained men could be secured, he could be sent round to the localities visited by Mr. Benson last year. But after some correspondence with that firm the matter was dropped, as it was found that none of their men were willing to accept the terms which were offered. The Board understand, however, that Messrs. Massey and Co. intend to send out some of their men to exhibit the working of their ploughs, to adjust and repair such as may brought to them, and to instruct the village blacksmiths how to execute repairs. It is hoped that this excellent example will be followed by other manufacturers as well as by the agricultural associations that are being started in some of the districts, *i.e.*, the Madura Farmer's Club and the Association at Tinnevelly.

26. The Board have also arranged to send one of their agricultural inspectors to the districts referred to, to find out exactly what difficulties and defects are met with in working the ploughs and to report through the Collectors how they can be overcome. On receipt of this report the Board will submit their views as to what might be done in this direction. The question is one of great importance and one in which manufacturers of improved agricultural implements and their agents are also greatly interested.

27. In paragraph 20 of his report Mr. Benson states that though he recommended some three years ago that steps should be taken to introduce the bamboo seed drill of the Ceded districts into other parts of the presidency, little has yet been done in the matter. The Board observe, however, that Mr. Benson's suggestion was communicated to certain Collectors and they were subsequently requested to state how far the introduction of the drill was successful. The Collector of Trichinopoly reported that the ordinary bullock power of his district was insufficient for working the drill and that the orifices were found to be too small for some grains and too large for others. As it is the skill of the sower and not the size of the orifice that renders the drill suitable for seeds of different sizes, some drills were exhibited and their working shown by Mr. Benson himself in July and August last year in Tinnevelly when he visited the district in charge of the travelling show. He reports that the advantages of drill-sowing were not appreciated, and that in fact it appeared "to be too far advanced for the comprehension of the average ryots as yet" (paragraphs 7 and 10 of his report in G.O., No. 1100, dated 26th December 1886).

A drill has recently been supplied to the Collector of Vizagapatam, the one sent him before having been found to be broken.

28. In paragraph 52 of his report Mr. Benson complains that nothing has been done regarding the formation of a museum of agricultural implements. The Board observe, however, that the Director in paragraph 43 of his last report expressed a doubt as to whether it was necessary for this department to do anything in the matter as the Educational department had undertaken to make a collection of the kind. Mr. Benson was asked in January last for some further information, which he has not yet furnished.

29. *Exhibitions.*—For the first time after an interval of nearly a quarter of a century an agricultural exhibition was held on the 29th to 21st March last at Gooty and another at Erode on the 19th to 21st April. A full report on the two exhibitions has already been submitted to Government. The number of visitors at the Gooty show was 6,127 and that at the Erode show was about 10,000. The cost of the two shows (Gooty Rs. 4,349 and Erode Rs. 4,792) was Rs. 9,141, of which Rs. 6,444 or 70 per cent. were given away as prizes.

The show of ponies and mules at Gooty was poor, but the cattle exhibited, though small in number, comprised some very good specimens. Mr Mills observes

that "better bulls could not be wished for than most of the Nellores exhibited." Regarding the cows and heifers, most of which came from the Ongole taluk of the Nellore district, Mr. Mills says: "I cannot speak too highly of them." Vegetable products were well represented. Under "animal products" there were only twenty exhibits, but under "manufactures" there was a fair show though nothing novel or remarkable was exhibited. There were fine cotton carpets from Adóni, Bhaváni, Dharwar, and Cumbum, those from Bhaváni and Dharwar carrying away the first and second prizes, respectively. Under "implements and machines" there was a good show of both indigenous and imported or improved implements, the latter having been contributed by Messrs. Oakes and Co., Massey and Co., and Ormerod and Co. It is only as regards ploughs and sugar-mills, however, that a comparison between the relative merits of the European and Native implements was possible, as the other kinds of European implements were wholly novel to the ryot and did not excite any great interest. The result of the comparison was, with one exception, in favor of the imported or improved implements, the exception being in regard to a plough for breaking up cotton soil and rooting up "nuth" grass, for which the well-known ponderous "Pedda Madaka" (big plough) of the Ceded districts was found to be better suited than all the other ploughs exhibited and gained the second and third prizes, no first prize having been awarded.

30. The Erode exhibition was not so successful as the Gooty one, especially as regards live-stock. The show of ponies was disappointing, that of cattle poor, and that of sheep very poor. It was thought that the poorness of the show of live-stock was due, not to the want of many very good specimens in the districts comprised in the show circle, but to the short notice, the want of energy and enterprize on the part of the owners, the smallness of the prizes offered, and, above all, to the prevailing superstition regarding the "evil eye." The show of vegetable products was decidedly good, both as regards number and quality, but that of animal products was poor, except as regards tanned hides and skins, while that of manufactures was not nearly so good as might have been expected. There was a good show of implements, and the relative merits of the European and country ploughs were tested by actual working as at Gooty. The ryots, however, considered the imported ploughs to be too heavy for the cattle, and too costly or difficult to set right when they got out of order.

On the whole, considering the novelty of the exhibitions and the shortness of notice to the rural population, the Board are decidedly of opinion that the results of the two shows are most encouraging.

31. An agri-horticultural show was held at Coimbatore on the 19th January last. It was organized by the leading citizens of the town and is understood to have passed off well. Rs. 3,407 were collected by voluntary subscriptions in the district and the total expenditure was Rs. 2,328, of which Rs. 1,373 represented the value of the prizes. It is gratifying to note that the committee who managed the exhibition did not find it necessary to accept the contribution of Rs. 500, which the Government, in compliance with the committee's request, offered to give them, as their receipts more than covered the expenditure. It is to be hoped that the show will be repeated at Coimbatore, and that similar shows got up without Government aid will be held in other important mofussil towns.

It is a matter for regret that the Farmer's Club at Madura were not able to hold any show similar to the very successful one of May 1885.

32. *The Colonial and Indian Exhibition, London.*—As stated in paragraph 42 of the last report, a collection of models of agricultural implements, and of cocoons, raw silk, silk fabrics, indigo cakes and tobacco leaves and cigars was contributed by this department for the Colonial and Indian exhibition. It is understood that it met with approval.

33. *Sale of Agricultural Implements.*—The Board have ascertained from Messrs. Oakes and Co., Massey and Co., and Somina Sooriah and Co. of Cocanada that 384 ploughs and 310 sugar-mills were sold by them in the year under report. Messrs. Oakes and Co.'s agent at Hospet sold sugar-mills of the value of Rs. 25,000 in 1886. The Beheea sugar-mills are now coming into rapid use in the Bellary and Godávari

districts. They are in use also in some villages in the Coimbatore and South Arcot districts.

34. *Silk.*—The action of this department in this direction was still in a preliminary stage at the close of the year. Samples of cocoons collected in the Kámbakam jungles of the Chingleput district were furnished to Mr. Cleghorn of Bengal, who had kindly consented to reel silk from them. Some of the cocoons were fresh and some pierced. The fresh ones gave an average of 80 tolas of raw silk per kahon of 1,280 cocoons. One cocoon gave a single thread of 1,194 yards and another of 800 yards. Mr. Cleghorn was of opinion that the quality of the fibre was superior to any tassar that he had had to deal with. In view of this very favorable report and as the trees, on the leaves of which the tassar worm feeds, abound in many parts of the presidency, the Board have recently submitted to Government certain proposals for the systematic rearing and collection of cocoons.

35. *Agricultural Experiments—Wheat and Barley Experiments on the Nílgiris.*—Allusion was made in paragraphs 51—54 of the last report to certain experiments which were made to introduce English and Punjab wheat and barley on the Nílgiris. The results of the experiment are summarized in paragraphs 38—40 of Mr. Benson's report. The English barley succeeded very well and gave a good crop which was purchased by the Nílgiri Brewery Company. The Punjab barley was found to be inferior to the species found in the district and no further attempts will be made to introduce it. The Punjab wheat succeeded fairly well. The flour was of very good color but was unsuitable for bread-making, the outturn of *soojee* being poor. The English wheat was a decided failure, the plants having withered in every case without producing ears. The wheats tried were of the soft kinds. It is intended to try white and red wheats of the hard variety from Belgaum and Dharwar in Bombay, Mozaffarnagar in the North-West Provinces or the Malwa.

36. *Distribution of Seeds.*—With reference to paragraphs 42 and 43 of Mr. Benson's report regarding seeds distributed to districts for experiments, the Board have since received reports from almost all districts and find that the experiments were in most cases utter failures. In South Arcot, however, Havanna, Kentucky, Virginia and Pensylvania tobacco seeds sown in two villages are reported to be in a thriving condition and to promise a fair yield.

Water Melons succeeded well in Ganjam.

Madagascar Paddy succeeded in three villages in the Nellore district.

Cawnpore Indigo did well at Gúdúr in the same district.

Manilla Hemp grew luxuriantly in the Tindivanam taluk of the South Arcot district.

With these few exceptions the experiments have everywhere been a failure.

37. *Babul (Acacia Arabica) Bark and Pods.*—It was stated in the last report (paragraph 55) that no sale could be found for the trial consignments of bark and pods sent home and that some consignments of bark had been sent to Australia to see if an outlet could be found for it there. The Board have since learnt that no buyers could be found at Melbourne or Sydney, and that the bark was sold at a loss at Adelaide. No further attempts will, therefore, be made to develop a trade in this article.

38. *Tobacco.*—With a view to improve the tobacco of this presidency, so as to make it suitable for the European market, Government have decided upon engaging, for two seasons, the services of a tobacco curer, who has learnt his work at the Poosa factory in Tirhut. The curer will instruct tobacco growers both as to cultivation and curing. His services will be available from the next tobacco sowing season.

39. *Linseed.*—With reference to paragraph 35 of Mr. Benson's report, it is observed that the London brokers, whose reports have since been received, are of opinion that, as Indian linseed oil is already well known in the home market, Government need take no action in the matter. The Secretary of State has, however, forwarded a small supply of the Balkan seed which will be tried in due course.

40. *Mahogany Plants.*—Some 2,000 plants were purchased by this department from the Agri-Horticultural Society's Gardens, Madras, and distributed as follows:—

To whom distributed.	No. of plants distributed.
Conservator of Forests, Northern Circle	1,200
District Forest-officer, Chingleput	150
Do. do. North Arcot	150
Do. do. South Arcot	150
Do. do. Trichinopoly	350
Total ...	2,000

The Conservator of Forests, Northern Circle, distributed the 1,200 plants sent to him to Cuddapah and Nellore. The results are reviewed in a recent report of the Conservator, who says that the plants were badly basketed and were eaten by white-ants. The plants raised in the forests of the same districts and in those of the Kistna and Nílgiri districts, from seeds received from Calcutta and Ootacamund, did fairly well. Of the 350 plants sent to Trichinopoly, 299 were doing well and averaged $2\frac{1}{2}$ feet in height at the close of the year.

41. *Date Palm.*—Seeds and offsets of the Arabian date palm were obtained by the Board of Revenue and furnished to the Forest Department for trial. The results of the trials have not yet been reported by the Conservators.

42. *Bee-keeping.*—Nothing has been heard from Dr. Shortt and Mr. Nicholson of Yercaud. In this connection the Board beg to record their deep regret at the death of Mr. J. C. Douglas, who took great interest in the subject and had promised to send some Italian bees to this presidency.

43. *Insects affecting Crops, &c.*—Specimens of insects which injured crops in the Vizagapatam, Godávari and Bellary districts were sent to the Superintendent of the Indian Museum, Calcutta. Those from the first-named district were identified by him as a species of moth belonging to the family *Arctiidæ* known to Entomologists under the name of *Alope Ocellifera.* Mr. Wood-Mason thinks that the most effectual remedy for exterminating these insects is that suggested by the Deputy Tahsildar of Bobbili, viz., to destroy as many eggs, caterpillars, cocoons, and moths as possible. He also states that if the growth of castor plants, which are the favorite food of the insect, were encouraged in waste lands near cutivated lands, the pest would probably be drawn away from the crops. The specimens of insects sent from Godávari and Bellary were identified as species of *Pyralidæ* and *Achœa Melicerti*, respectively.

Cattle-breeding and Veterinary Inspection.

44. *Government Cattle.*—The cattle belonging to the late Saidápet Farm have been in charge of the Principal of the College of Agriculture. They, as well as the Amrat Mahal cattle stationed on the Pulneys and at Devakolam, were, on the whole, doing well during the year.

45. *Stock-breeding.*—It was stated in paragraphs 61 and 62 of the Director's last report that the idea of establishing a stock-breeding farm had been given up by Government on account of the large initial and annual outlay which it would entail and on account of the risk involved, as the stock bred might not be of the kind wanted and that, therefore, it was decided to place selected sires and dams in a central depôt, to be drafted thence, when of proper age, for use to selected districts or portions of districts where the cattle are poor and need improvement. Considerable difficulty was experienced in obtaining a suitable site for the central depôt. This has, however, now been overcome and a good site has been selected near Hosúr in the Salem district, where the requisite sheds and buildings are being erected under the supervision of Mr. Dumergue, the Sub-Collector.

The cattle now in charge of the Principal of the College of Agriculture will be moved into the depôt as soon as the cold weather sets in, and the stock will be added

to by purchase as far as funds will permit. The Board hope to be able to report some tangible results in the current year.

46. *Pony-breeding.*—From July 1886 to January last there were two stallions at work in the Coimbatore district and two in the Hosúr division of the Salem district. Four more stallions were purchased and sent to Coimbatore in January 1887, so that there are now six stallions in that district. The number of mares covered during the year was 75 in the Coimbatore district and 26 in the Hosúr division, total 101. The results are not as satisfactory as might be wished, but it must be remembered that four of the stallions were purchased only in January last, and were, therefore, at work for only three months. One of the old stallions was ill and was not fit for work for a month. The chief reason, however, for the smallness of the number is to be found in the fact that the village tats, unfit as they are for breeding, are often let loose to graze and monopolize the mares. As remarked by the Director last year, it is not possible to compel owners to castrate the undesirable sires, but, as a first step towards lessening the existing evil, Government have sanctioned the employment of trained salustries to castrate entire ponies and to treat the sequelæ and have also authorized the grant of a reward not exceeding Rs. 3 for each pony brought for castration and the provision of handsome prizes for geldings at future agricultural shows.

Salustries were accordingly entertained in Coimbatore and in the Hosúr division of Salem, and though they commenced operations very late in the year, the number of ponies castrated in Coimbatore, before the end of March, was sixteen and that in the Hosúr division up to 23rd April last fifty-eight. It is satisfactory to note that all the cases were successful and not a single casualty occurred. Orders have recently been issued to castrate bulls also and operations are now in progress. There is reason to hope that, under the influence of the measures now being pushed forward, viz., castration of ponies and bulls, and stock and pony-breeding, there will, ere long, be a marked improvement in the cattle and ponies of the Coimbatore and Salem districts.

47. *Ensilage.*—Allusion was made by the Director in paragraph 66 of his last report to the ensilage experiments which the Government had ordered to be made on a large scale. As yet reports have been received from only five officers, viz, Mr. H. G. Turner, Collector of Vizagapatam, Mr. Nicholson, Collector of Anantapur, Mr. Horsfall, Sub-Collector of South Arcot, Mr. W. Dumergue, Sub-Collector of Salem, and Mahomed Ali Sahib, District Forest-officer of Chingleput.

Mr. Turner's experiments were a failure on account, probably, of the rain which fell during the time when the silo was being filled. Cattle would not touch the silage.

Sixteen silos were made under Mr. Nicholson's orders; of these, nine were opened in May, June and July last, when it was found that the silage in six was good and, its flavour being pleasant, it was eaten by cattle. In one, which was filled with green paddy stalks and spear grass, the silage was mouldy and had a strong smell. It was not offered to cattle, but they were found to pick up the stuff lying around the silo afterwards. The silage in two was useless and emitted a strong unpleasant smell. The remaining six silos will be opened later on.

Mr. Horsfall's own experiments were unsuccessful, but a ryot of Gingee, named Narainsami Nainar, was more fortunate. He made three silos under Mr. Horsfall's guidance and advice in November and filled them with over-ripe hill grass, ripe field grass and dry ragi stalks, respectively. The three silos were opened on the 9th June when it was found that, though the over-ripe grass and the dry ragi stalks were a failure, the grass from the fields was an astonishing success, every blade of it having been eaten most greedily by cattle which had never seen silage before.

Mr. Dumergue's experiments were as successful as could be wished. His silo was 30′ × 12′ × 6′ and was filled with the ordinary kinds of grass in September 1886. It was opened on the 23rd March last, and was found to emit a strong smell not unlike that of a tannery, but this smell evaporated after a few hours' exposure. The silage was then found to be so good that Mr. Dumergue had more applications from ryots than he could comply with. Cattle and country ponies ate it most greedily

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and throve well upon it. The castrated ponies were fed with it, mixed with grass for a short time and finally without any mixture at all and throve well. In one case the effect was remarkable. A man brought a pony for castration in such miserable condition that it did not seem able to stand the operation. The owner, however, insisted on its being gelt, as it was so troublesome and gladly accepted all risks. Contrary to expectation the animal recovered quickly and was not taken away for a fortnight after, during which time it was fed on nothing but silage. The owner at last came for it and, when told to take it, did not recognize it. " I brought it here so thin " he said " and now it is so fat, what is this ? "

Mahomed Ali Sahib, District Forest-officer, Chingleput, had two silos constructed and filled with grass. One of them was opened on the 23rd March last and emitted an unpleasant smell ; the silage was readily eaten by cattle, but refused by ponies, sheep, goats and donkeys. On the following day the silage was exposed to the air for a little while and was eaten by 300 head of cattle. On the third day, when His Excellency the Governor was present, the silage was offered to the cattle at the Guindy Park and to some other cattle and was fairly eaten. A milch cow, a bullock and a milch buffalo were hired and fed for one week on the silage mixed with paddy straw. At the end of the week the animals were weighed and showed the following results :—

—	Milch cow	Milch buffalo.	Bullock.
	LB.	LB.	LB.
Beginning of the week	356	536	365
End of the week	361	546	365
Difference ...	+ 5	+ 10	...

Mahomed Ali Sahib's second silo was opened on the 8th June last, and though it emitted no unpleasant smell, cattle refused to touch the silage. He thinks that the failure was due probably to the coarseness of the grass used which was also too ripe when it was put into the silo.

The Board consider that there can be now no doubt that grass can be silaged in this presidency, though more experience is needed to ensure the fitness of the product. They will take steps when all the reports have been received to publish the results as widely as possible.

48. *Inspection of Cattle Disease and Veterinary Hospital.*—The Cattle Disease Inspection department consisted of an Inspector, a Deputy Inspector, eighteen Local Inspectors, and one Probationer. Mr. Mills' report for the year is appended to these proceedings.

49. The number of animals admitted for treatment in the Veterinary Hospital at Saidápet was 198 against 339 in the preceding year. The falling off is attributed by Mr. Mills to his own absence on tour for six months (from July to December) and to the fact that there was no serious outbreak of disease in the villages in the neighbourhood. The Board observe that the number of animals admitted from 1st July to 31st December last was 119 against 111 and 77, respectively, during the corresponding periods of the two preceding years. Mr. Mills' absence on tour does not, therefore, seem to have affected the admissions to the hospital. The second reason assigned by Mr. Mills for the falling off seems, however, to be probable. Forty-one animals belonging to the late Government Farm and suffering from epizootic aphtha and 75 belonging to Guindy Park and suffering from braxy were admitted in January 1886 alone for treatment. There were no such abnormal admissions during any part of the year under report.

50. No further experiments in protective inoculation were made, as Mr. Mills considered that all that was necessary had already been done. It is probable that a

laboratory will be established by M. Pasteur in this country when further experiments will be conducted in connection with it.

51. The following table shows the statistics of cattle disease and mortality during the year :—

Disease.	Number attacked.	Number died.	Percentage of deaths to attacks.
Epizootic aphtha	67,454	6,546	9·70
Rinderpest	47,491	33,789	71·15
Anthrax	22,381	18,558	82·92
Variola	17,678	9,839	55·65
Other diseases	26,049	21,843	83·85
Total ...	1,81,053	90,575	50·00

As in the preceding year, epizootic aphtha, rinderpest and anthrax were the most prevailing diseases. The total number of deaths from these and other diseases was 90,575 or ·47 per cent. of the total number of cattle returned for the presidency. Kurnool, North Arcot, Cuddapah, Bellary, Vizagapatam and Chingleput show the largest number of deaths.

52. Besides the deaths mentioned above, 144 cattle are reported to have been killed by poisoning, while 44,065 are said to have died from natural causes. It is somewhat remarkable that nearly half the number of deaths from poisoning occurred in the district of Anantapur.

53. *Cattle Census.*—Under instructions from Government the statistics of agricultural stock furnished by curnams were tested by Divisional officers without previous warning in the marginally-noted districts, and it was found that the village returns had not been prepared on any uniform principle. In some villages only the cattle of pattadars or ryots holding land direct from Government on the ryotwari tenure have been shown in the accounts and not those of inamdars and other classes. In some cases animals under five years of age and calves and heifers have not been shown. The form prescribed in the old Village Manual for recording these statistics was somewhat defective. This has been rectified in the revised Village Manual and clear instructions have been laid down, which will prevent the recurrence of such omissions in future.

1. Ganjam.	4. Anantapur.
2. Kistna.	5. Trichinopoly.
3. Cuddapah.	6. Salem.

Rail-borne Trade for 1886-87.—The registration of traffic by rail was commenced in this presidency in April 1885. The total trade amounted to 34,900,632 maunds and compares with the trade of the previous year as shown below :—

—	1885-86.	1886-87.	Increase.	Percentage increase.
	I. MDS.	I. MDS.	I. MDS.	
Imports from external blocks ..	2,312,296	3,023,780	711,484	30·77
Exports to do. ..	1,997,272	2,609,114	611,842	30·63
Internal trade	25,585,789	29,267,738	3,681,949	14·39
Total ..	29,895,357	34,900,632	5,005,275	16·74

External Trade.—The external tradeor the trade with other British provinces and Native States is chiefly confined to Mysore, Hyderabad and Bombay. The principal articles of import were grains, provisions, hides and skins and sugar. The exports which were chiefly from Madras City, North Arcot, Bellary, Malabar and Coimbatore consisted of rice, provisions, salt, timber and sugar. Compared with the preceding year there was a large increase in the import of gram, timber, oil-seeds, hides and skins, raw cotton and wheat. In the exports also there were increases in

the following articles, viz., timber, railway plant and rolling stock, provisions, sugar, til or gingelly and rice; on the other hand there was a decrease under "Grains, other kinds," gram, "oil-seeds, other sorts," and salt.

Internal Trade.—Of the trade within the presidency, the most important article was stone and lime which formed 23·14 per cent. of the total trade under this head. This article was chiefly required for the Harbour works. The proportion of the trade in the other principal articles was rice 13·54 per cent., salt 9·9 per cent., oil-seeds 7·77 per cent., provisions 6·59 per cent., "grains, other sorts," 4 per cent., gram 4 per cent., and sugar 3·79 per cent.

Traffic by road with the Native States of Mysore and Hyderabad.—The total value of the traffic registered in 1886-87 amounted to over 2 crores and 93¾ lakhs of merchandise and 18¾ lakhs of treasure against 2 crores and 87 lakhs of merchandise and 14½ lakhs of treasure registered in 1885-86. The details are given below:—

—		1885-86.		1886-87.	
		Merchandise.	Treasure.	Merchandise.	Treasure.
		RS.	RS.	RS.	RS.
Mysore ..	Exports to ..	71,52,735	3,73,689	73,71,971	4,25,188
	Imports from ..	1,36,01,255	2,39,235	1,36,02,624	3,17,939
Hyderabad..	Exports to ..	30,07,966	960	33,87,548	3,352
	Imports from ..	49,77,495	8,49,600	53,15,426	11,38,366
Total ..	Exports to ..	1,01,60,701	3,74,649	1,07,59,519	4,28,540
	Imports from ..	1,85,78,750	10,88,835	1,86,18,050	14,56,305
	Total ..	2,87,39,451	14,63,484	2,93,77,569	18,84,845

Trade with Mysore.—The principal articles exported from this presidency to Mysore were animals and Indian cotton piece-goods (over 15 lakhs each); provisions, spices and oils (over 3¾ lakhs each); rice and paddy (3 lakhs); silk and tobacco (over 2½ lakhs each); and salt (2 lakhs). The principal articles imported were spices (28 lakhs); animals (26½ lakhs); coffee (16½ lakhs); sugar (7 lakhs); rice and paddy (5½ lakhs); cotton piece-goods, Indian and European (5 lakhs each); timber and wood (4¾ lakhs); and seeds (3¾ lakhs).

Trade with Hyderabad.—The chief articles exported to this State were European cotton piece-goods (7½ lakhs; Indian cotton piece-goods (5 lakhs); fruits and nuts (over 4¼ lakhs; tobacco (3¾ lakhs); rice and paddy (over 2¼ lakhs); sugar and other saccharine produce (over 2 lakhs); salt (nearly 2 lakhs); and spices (over 1½ lakhs). The imports consisted chiefly of seeds (over 28½ lakhs); opium (over 3¾ lakhs); oils and provisions (2½ lakhs each); timber and wood (2 lakhs); raw cotton (1¾ lakhs); and animals (1½ lakhs).

(A true Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

To the Secretary to Government, Revenue Department.

ENCLOSURE No. 1.

ANNUAL REPORT OF THE ASSISTANT DIRECTOR OF AGRICULTURE.

Personal.—From the beginning of April till June, I was engaged at Madras in office work, but on the 8th of the latter month proceeded to Karúr to inspect the Nerur padugays, which it was suggested might prove useful in connection with the proposed stock farm; at the same time I visited Mr. Little's farm near Karúr. On the 2nd July I proceeded to Chidambaram, in charge of a travelling show of agricultural implements, and was absent from head-quarters till the end of August on this

duty, visiting various places in the Tanjore, Tinnevelly, Madura, Trichinopoly, and South Arcot districts with the show. On the 10th September I again left Madras, this time for Kurnool, to make inquiries in connection with the analysis of that district and in order to supervise and instruct the inspectors who had already started work there. I remained in the district till the 21st October and then returned to Madras for a few days. From Madras I proceeded to Hosúr to inspect some land near there which it was thought would be suitable for a stock depôt, and thence to Coimbatore to see the Collector regarding the exhibition at Erode. This kept me till the 7th November. As I was starting for Kurnool again on the 9th November, news arrived that the Railway had broken down, and I was delayed in Madras a few days; but, leaving on the 14th and proceeding first to Gooty in connection with the exhibition to be held there, I then marched through parts of Kurnool on another tour of inspection and inquiry, and returned to Madras on the 14th December. I halted at head-quarters during part of the Christmas holidays; but, leaving Madras on the 3rd, I spent January in the Cumbum and Márkápur taluks of Kurnool, thus completing my examination of the district, and returned from the latter taluk over the Dornál pass to Atmakúr and Nandyál and thence to Madras by the 15th February. I halted in Madras for the celebration of Jubilee and then proceeded again to Hosúr for a further inspection of the land available for the stock depôt; thence to Whitefield, where I visited the Eurasian settlement; then to Erode, whither business in connection with the exhibition took me; and lastly to Madura, to inspect the farm belonging to the Madura Farmer's Club, returning to Madras on the 4th March. There I halted till the 21st idem, when I proceeded to Gooty to take executive charge of the show there. This work detained me till the 1st April, and I returned to Madras on the 2nd.

2. Most of the year was thus spent on tour. It was very unfortunate in some respects that the travelling show engaged my attention during July and August, when it was most desirable that the Agricultural Inspectors, then newly started at work in Kurnool, should be closely supervised and carefully instructed. It was unfortunate for them and bad for the work. I represented this at the time, but it was considered necessary for me to go south instead of north.

3. It is also very evident that the growing work of the department is more than one officer can properly attend to, and the work is likely to expand rapidly in the future. The district analysis work is enough to occupy the attention of a single officer always, and, even if the plan of carrying that on is entirely revised, the work of getting our statistics into proper order will require a great deal of labour and attention.

I.—Land Records.

4. The improvement of the statistical records available has been stated to be one of the chief functions of the Agricultural department. A great step has been taken in preparing the new manuals of village and taluk accounts, but still much remains to be done. This is chiefly in the provision of means for testing and checking the returns regularly, and in seeing that they are properly prepared and not fudged as is too often the case at present. In the course of my tours in Kurnool, I paid great attention to the subject, but of course having no status in the district could do little towards improvement. Peculiarly I almost invariably found that the cropping statistics of the cusbah villages of taluks were almost the worst kept in all taluks.

5. As far as this department is at present concerned, the statistics which require most attention are—

(1) *The Cropping Returns.*—Now not checked in the field and not tabulated in any definite manner.

(2) *Record of Water-supply and Irrigation.*—Now fairly complete as regards irrigation, but altogether wanting as regards subterranean water-supply.

(3) *Returns of Live and Dead Stock.*—Now prepared in a haphazard manner and never checked.

(4) *Registers of Cattle-disease and Mortality.*—Now ordered to be kept in a form which is far from clear and not at all closely looked after or checked as they should be.

Regarding all these, I have the honor to submit suggestions during the past year, but as yet, as far as I am aware, without any results. For Kurnool we have completed a tolerably complete record of the water-supply and checked carefully a return of live and dead stock for all villages, besides doing something to get the cattle disease registers into better order. No attempt has been made to check in detail the cropping returns in Kurnool; the matter was under discussion during the year, but it was considered that the work would be more than the Agricultural Inspectors could get through. It is to be hoped that in the future the available force will be made sufficient to deal with this subject also.

II.—The Analysis of Districts.

6. As related in the last report, the year started with a large portion of this work being taken out of my hands. In their order, dated 25th June 1886, No. 528, however, Government decided that the tractwar plan, the importance of adhering to which I have all along urged, should be adopted, and this led subsequently to the whole of the work for both the famine and agricultural analyses being combined and placed in my hands late in the year, and to a representation being made to Government of the stupendous nature of the work and the necessity, if it is to be carried out, of providing a large staff of clerks to collate and tabulate the statistical information which exists. Orders on this latter reference have been received since the close of the year, and in persuance of further instructions from the Government of India, the method to be followed in future will be entirely revised. It seems probable that the task of working up the analyses will be deferred to some future date when the statistics available have been made more trustworthy than they now are.

7. To collect information in the district to be analysed, a staff of seven Agricultural Inspectors was sanctioned from the 1st April 1886, but it was decided to appoint only five of them at first. Five passed students of the Agricultural College were selected; but of these two, after accepting the appointments offered them, did not take them up, on hearing that they would have to work in Kurnool; one Inspector was immediately detailed for other work on the Nílgiris, and one was kept for about two months on duty in the Centeral office at Madras, so that only one Inspector commenced work in Kurnool in April. Considerable delays occurred in filling up the two vacancies referred to, and it was not till the beginning of June that two more qualified men were obtained and sent to Kurnool. Early in that month there were four Inspectors at work there, and at the beginning of July a fifth was appointed and sent to the district. Towards the end of July one of the Inspectors, who had not been working satisfactorily, relieved the department of his presence by resigning. Up to this time the Inspectors had all been working under considerable difficulties, as the work was new to them, most of them were new to any district work, and several had only a limited knowledge of Telugu, and I was engaged on other duty in the south of the presidency and could not assist them or set them straight. Properly the Inspectors should, for some time after they were first sent out, have been kept under close supervision, but this was not possible as has already been shown.

8. Another Inspector was appointed in July and placed on duty in the Kistna and Godávari districts to inspect and report on the suitability of certain blocks of land offerred there for use in making certain experiments in the economy of irrigation water. After completing this, he also proceeded to the Kurnool district arriving there early in October. In the meanwhile at the end of August, the first Inspector deputed to Kurnool fell ill of fever, and did not return to duty during the year. At the beginning of September, to fill up the vacancy caused by the resignation above mentioned, yet another Inspector was appointed and set to independent work early in October. This last appointment brought the strength up to the sanctioned number, with one man absent on sick leave. But towards the end of September, after three months' trial, it was found necessary to get rid of another of the Inspectors, a Mahomedan, and it was not possible to fill up the vacancy thus caused until early in November. The Inspector who had been on duty on the Nílgiris also became available then for work in Kurnool, and by the middle of November six Inspectors were working in that district. Until the early part of December work was confined to the six taluks west of the Nallamalais,

but during that month three Inspectors were diverted to the Cumbum and Márkápur taluks. At the beginning of January another qualified man was appointed to act in the vacancy then existing, bringing up the strength to seven only, six of whom were on duty, one being absent owing to ill-health (fever). Early in February the acting Inspector's health gave way after not a month's work and he resigned his appointment. Early in March and towards the end of the month, two more Inspectors were obliged to take leave owing to ill-health, whilst all the others, who remained on duty during the year, suffered more or less severely from the effects of the climate and the nature of their work.

9. Owing to the difficulties in getting a staff together, the diversion of some portion of the Inspector's time to other work, the ill-health common more or less to all, and to the fact that the Inspectors started under most unfavorable circumstances on new and untried work without any one to guide them who was near by, there has been considerable delay in completing the work which they have attempted. This has been, first, to check carefully a special return of the live and dead stock of the ryots in all villages, and secondly, to prepare a return of the water-supply of every village with special reference to wells and underground water. The Inspectors have also had to note and report on the agricultural systems and practices of the localities in which they worked according to the scheme shown in appendix I-B to my last annual report.

10. Taken, as a whole, the work done by the Inspectors has been satisfactory since my visit to the district in September and October last. It still remains to work up the results and notes which are now on record. At the end of the year the following number of villages had been or remained to be examined in the taluks noted :—

Taluks.	Villages Examined.	Villages To be examined.
Pattikonda	78	31
Rámallakót	103	6
Nandikótkur	100	...
Nandyál	92	...
Koilkuntla	81	5 partly.
Sirvel	40	45 do.
Cumbum	74	33
Márkápur	68	28

The whole work was completed by the 13th May.

11. The task of working up the results of my own and the Inspectors' inquiries and of tabulating all the available and collected information tractwar still remains to be completed. For the latter portion of the work, no provision has yet been made, and the matter is still under discussion. As regards the former, my time is usually so much cut up by the various calls on it, which take me hither and thither that I find it difficult to make much progress. The work requires that I should sit down steadily for about three months and collate all the available information. The Inspectors have now been brought to head-quarters to put the whole of their notes together in a clear form for my use. Until that and the compilation first alluded to is done, I cannot complete my work.

III.—Exhibitions.

12. After a pause of three years, and at the last moment, two mofussil agricultural exhibitions were organised during the past year. One did not come off till after the close of the official year, but as it properly belongs to the work of the year under report, it may be referred to below.

13. The mofussil exhibitions were resolved on in 1883, after the last central exhibition held at Madras in that year, and it was then decided to hold two mofussil exhibitions annually for four years, and in the fifth year a central one at Madras. In the first year from a bad season, and in the second and third owing to financial exigencies it was not possible to hold the mofussil shows. In the year under report owing to frequent changes in the direction of the department, it was not until my

return to Madras in October last that the draft prize lists were sent out to the Collectors of Coimbatore and Anantapur for their remarks, and not till early in December that they were submitted to the Board and Government for orders. Some alterations then introduced at the suggestion of the Board were found to make the prize list unworkable in some respects, but Government refrained from revising them as they were submitted at so late a date.

14. Owing to the delays referred to, and to the recommendation of the Collector of Anantapur, it was found necessary to defer the Gooty show till the end of March, and that to be held at Erode till the 19th April. The date fixed for the Gooty show was found very inconvenient, and it should be possible to arrange that both the shows may be held during or before the month of March in future and that the latest of the two should close before 24th or 25th of that month, to allow of all accounts being closed before the end of the official year.

15. I have not yet seen the official reports of these shows, but from my own observation have no hesitation in saying that the Gooty one was much the more successful. It was characterised by a fine gathering of working cattle, for which, peculiar to relate, the prize list did not contain a single prize. These cattle were chiefly of the Nellore breed, which reaches probably its greatest development on the black-cotton soils of Kurnool and Cuddapah; but there were good representatives shown of other distinct breeds raised locally either in Anantapur or Kurnool. Besides this, the Nellore breed was represented by some good cows, heifers, and calves brought all the way from Ongole by their owners. The show of buffaloes was of the most meagre description, probably because these animals, at least the cows, are in charge of the womankind of the ryot's family. The sheep and the ponies were very poor. The collection of produce was, on the whole, good, and that of manufactures interesting; whilst in the implement section the show of the characteristic implements of the Ceded districts must have been striking to any one only acquainted with what the Tamil ryot uses, and the stands of Messrs. Massey and Co. and Messrs. Oakes and Co. contained a very fair show of ploughs, the utility of which was demonstrated during the exhibition, and of other implements and machines more or less suitable for use in India. The show was visited by a very considerable number of people, and, on the whole, was successful.

16. At Erode, the show of cattle was poor, of sheep bad, of ponies inferior, and of buffaloes *nil*. The produce brought in made a good show, especially the classes of cereals, pulses, oil-seeds, sugar, tobacco, and timbers, but in other divisions was not of great value. It was much aided by exhibits from Cochin and Travancore, especially of timbers. In the section devoted to manufactures, the show, on the whole, was not good, although in some classes there was a fair number of exhibits of good quality. At this show the exhibition of implements was nearly all made by Messrs. Massey and Co. and Messrs. Oakes and Co., but two seed-drills brought down from Anantapur seemed to be beyond the comprehension of the local ryot. Here also successful plough trials were carried through on both dry and wet land. The arrangements at this show were not so successful as those at Gooty, the then recent changes of Collectors having been prejudicial to the show. Nevertheless the show was fairly successful, though it is to be hoped that on another occasion a better show of stock will be forthcoming.

17. It appears advisable that the selection of places for these shows should be reconsidered, and that the prize list and regulations overhauled thoroughly by a competent committee, after Government have laid down the general principles on which they should be framed. To make the shows a success, they must be repeated frequently—annually if possible—at the same place, and the prize list must be widely and thoroughly circulated a good many months before the shows are to come off. Unless the shows are repeated at or near the same place frequently, the people will not come to understand the objects of them, nor will they be encouraged to produce superior articles for competition and sale and the prizes will be so much money thrown away.

18. The question is now under consideration whether the show next year shall be held in Madras, according to original arrangements, or whether further shows shall be held in the mofussil before another Central Exhibition.

IV.—The introduction of improved Implements, &c.

19. For many years work in this direction has been carried on. Doubtless many errors have from time to time been made, but the work was for many years purely experimental in endeavouring to adapt the improvements made in the West to the conditions we meet with in India. Much labor and time were lost from defective information on the latter point. The officers of Government, who understood the plough, for instance, were kept tied down at Saidápet, instead of first acquiring a thorough knowledge of the ryot and his practices. Much groping in the dark consequently followed. However, no one can now deny that great progress has been made in the adaptations necessary, and the chief work ahead is to bring the value of these improvements home to the rural population.

20. Experience has proved that there are few implements and machines for which the time of introduction has come in Southern India. The more prominent of these are ploughs, sugar-mills, and boiling-pans. The bamboo seed-drill of the Ceded districts may also be advantageously brought into use in the Tamil countries, where it is as yet unknown. I recommended this in my report for the year 1883-84, but little has since been done in the matter.

21. In June last it was resolved to organise a travelling show of agricultural implements to visit the southern districts under my supervision. It started at the beginning of July, and during that and the following months visited many places in the South Arcot, Tanjore, Trichinopoly, Madura and Tinnevelly districts. At most places the show consisted of working the ploughs in dry and wet fields, and in exhibiting the other machines taken at work at some convenient place in the towns or villages visited. Almost everywhere considerable interest was excited by the show, and large crowds gathered to see and discuss the work. The chief intelligent interest centred round the smaller ploughs and towards the end of the programme of visits work was almost solely confined in the field to working Messrs. Massey and Co.'s E.P. and Indian Ryots' ploughs and Avery's Hindustan plough.

The former firm sent an agent with the show on all its travels, and sold a considerable number of ploughs from a stock sent out in his charge.

22. It is as yet too soon to judge what the real results of this show may be. They can only be estimated when the ryots have had time to use the ploughs they purchased. My opinion is that it will be necessary to send round some one over the same ground again to see that the purchasers of ploughs have not been disheartened by small difficulties and been led to abandon their use. The introduction of such novelties as these ploughs must always be a matter requiring persistent action and encouragement. This work is one particularly suited for local action, and Government can only make a beginning. The knowledge of the value of improved ploughs needs to be carried to every village, and the margin for profit on the smaller ploughs is so small that we can scarcely expect the manufacturers to sink large sums in doing this. The value of an improved implement of tillage to the ryots is also so great that it must always be a great object for Government to bring it to the notice of the people.

There always must be difficulties in the way of introducing such things as these ploughs, but the chief one now is, in my opinion, that of repairs. If we wish to see the ploughs brought into regular use, we must take steps to look after the people who are now trying the ploughs in different places.

23. The results of this show were so satisfactory to Government that it is intended to start another this year, and, if it is possible to find a man who is capable of taking charge of the show by himself, to continue the working of it throughout the year.

The real difficulty in arranging for making such shows permanent is in obtaining a suitable person to put in charge. A man is required, who not only thoroughly understands the articles he is in charge of, and who is capable of showing them well

and explaining their advantages to the ryots, but also who thoroughly understands the way in which the ryot looks on such articles and how he should be approached in order to recommend the novelties to him. He should also be active and energetic.

24. Besides the travelling show, not much has been possible in the direction of introducing improved implements, &c., during the year; but I cannot refrain from mentioning here the great loss which the cause of improved agriculture in Southern India underwent during the year in the early death of Mr. C. Krishnasawmy Mudaliar of Shiyáli, than whom no one perhaps has done more to demonstrate the utility, and profit to be derived from the use of improved ploughs, even under what are usually looked upon as unfavorable conditions. This was only a small fraction of what he did in a few short years, as numerous records of his work which have been published show.

25. No further trials with the sugar-mill and evaporator, referred to in paragraphs 22—24 of the last report, were possible during the year, but arrangements are now in progress for their being tried on sorghum crops raised in South Canara.

26. *The Beheea Sugar-mill* appears to continue to grow in favor as its value becomes known. Mr. Lloyd, Divisional Engineer of South Indian Railway at Villupuram, reported that he had worked the mill successfully in the South Arcot district, and that, after a week's trial to show the ryots how it worked, it was readily hired by them at the rates he asked, though he began late in the season after they had already made their regular arrangements for crushing their cane. At Hospet in Bellary also the mill has taken firm hold and a local agent now sets up the mills himself, and at the Gooty show exhibited a mill put together by himself, which carried off the first prize from one of Thomson and Mylne's own mills shown by Messrs. Oakes and Co., Madras. Messrs. Oakes and Co. report the demand for the mill to have been very good indeed. I am not aware of what success the mill continues to secure in the Godávari, but it is undoubtedly gaining ground generally. Wherever sugar-cane is grown for jaggery or sugar, there is room for its introduction.

27. During the year a competitor, for the favor which the above mill has met with wherever it has been introduced, was brought forward in this presidency, viz., Shanks' patent sugar-mill. I learn that some success has attended the introduction of the mill. It appears now that as there are several sugar-mills in the market that a full public trial of them is desirable and might be arranged for during the current year.

28. The Government of India during the year drew attention to certain hand centrifugals for separating sugar from molasses, which have been introduced with considerable success in Bengal by Messrs. Thomson and Mylne of Beheea, but it was not found possible to do anything in the direction of introducing these machines during the year.

The following report from Mr. J. A. D. Lloyd, A.M.I.C.E., Villupuram, regarding another of Messrs. Thomson and Mylne's adaptations, viz., their sugar-pans, will be read with interest. He says that these pans, as compared with the ordinary deep pans in use in South Arcot, "effect a considerable saving both of fuel and time in boiling down. The method of using the pans is to pour into them a small quantity only of juice at a time. The pans being so shallow, the steam is blown off as it rises, and evaporation is effected at once; the 'goor' is then scraped to the edge of the pan with wooden scrapers and the operation is repeated. The principle, on which the making of 'goor' of good crystalline quality depends, is to hurry through the various operations of extracting the juice and boiling down; any delay is apt to give rise to incipient fermentation, which once set up prevents the 'goor' from crystallizing. It is owing to this that 'goor' made from juice which has been expressed by the wooden mills of the district is of such inferior quality; the cane has to be passed twice through the rollers, and the juice is full of particles of broken cane and other impurities, so that by the time it is ready for the boilers the probability is that incipient fermentation has set up."

29. The following extract from a letter from Messrs. Massey and Co. will be of interest in connection with the subject of this section :—

"We find that the ryot is taking to improved implements, but very slowly. In most instances orders are being repeated where implements are at work, and duplicate parts called for. The difficulty is to manufacture sound and good implements at the price the ryot is prepared to pay."

Messrs. Oakes and Co. remark on the same subject as follows :—

"We should say that during tha past year the inquiries from native agriculturists have been far in excess of of previous years, and we think we notice a greater readiness to buy whenever they feel assured that the machine or implement really performs what is claimed for it. There is no doubt that the system of agricultural exhibitions in different centres introduced by the Government is doing an enormous amount of good to the country, which is not apparent on the surface. In our own experience we find that no business is done at the time of the exhibition, and we have often felt that our money and time had been wasted; but we have been agreeably surprised later to have further inquiries from natives whom we have seen at an exhibition, perhaps some months before."

V.—Farming and Farm Crops.

30. *The Saidápet Farm.*—This remained in charge of the department until September last, when finally orders were received sanctioning the transfer of parts of the estate to the Agricultural College, the Commissariat Department, and to the Veterinary Hospital. About 80 acres remain in charge of the department pending decision as to its final disposal. The farm buildings were transferred to the Educational Department, but as no other place was available for the location of the stock belonging to this department, a portion is still used for them. It is hoped that these stock may be removed during the early part of the current year, and all connection of the department with Saidápet shortly cease.

No actual farming operations of any sort were conducted during the year in the presidency by the department. The live stock belonging to it is even at present in charge of the Educational Department. Under these circumstances, there is nothing to report regarding direct farming operations.

31. *The Madura Farm.*—This institution continues to receive aid in the shape of a Government grant for the pay of the Superintendent. It was visited and reported on twice during the year. On the occasion of my first visit in July, I submitted a report, which was recorded by Government, to the following effect :—The general condition of the farm was more satisfactory than at my previous visit and field work was advanced. The stock kept still appeared too large and the provision for their upkeep insufficient; some of the cows and cattle appeared underfed and in bad condition, and the sheep flock was in a wretched state. The managing committee appeared to be scarcely working.

Early in March, the farm was again inspected. The season had been a bad one and for the most part the crops on the farm had failed. Though dairying is the chief undertaking, there was scarcely a blade of green fodder on the farm. The herd of cattle maintained is still very heavy, though less than at the time of the previous inspection. There are no facilities on the place for rearing young stock, whilst there were no less than 21 bull and 51 heifer calves and yearlings on it. Foot and mouth disease had been prevalent amongst the stock, and the Government animals looked poor. A set of interesting experiments on the feeding of dairy cattle was in progress, but had been complicated greatly by the outbreak of disease mentioned. Some interesting experiments had been started in shade-drying tobacco. I found it impossible to arrive at a correct view of the financial position of the farm from the records available.

At this visit, I had to consider the propriety of recommending the continuance of the Government grant after August next, and not being satisfied with the present arrangements, was led to make certain recommendations in consequence.

No report has yet been received from the Farmer's Club on the work of the farm during the past year.

32. *The Karúr Farm.*—This is rather an agricultural colony for the settlement of orphans rescued by the Wesleyan Missionaries at Karúr during the famine of 1876-78. No additional assistance was given to it during the year. It was visited in June,

when there was little to be seen in the way of crops or cultivation, but it appeared to be making progress as a settlement and the stock kept thereon to be in fair condition. Mr. Little, who has charge of the settlement, states that so much good cannot be done as might be owing to the fact that the weekly market at the neighbouring village of Uppidamangalam is held on Sundays. He also states that this day was only lately selected as market day.

33. The death of Mr. C. Krishnasawmy Mudaliar has already been alluded to. His estate was not visited during the year under report owing to the want of a convenient opportunity during his life-time.

34. *Irrigation Experiments.*—The sites in the Kistna alluded to in paragraph 71 of the last report and another selected by the Collector of Godávari were inspected during the year by an Agricultural Inspector, and his report was not at all promising. In submitting the results of his investigations, I was obliged to point out that I should personally inspect the sites and satisfy myself of their suitability before I could draw up any programme, and also that thereafter it would be necessary for me to visit the experimental blocks frequently in order to see that all was going on as it should. This, with my other duties, was evidently not feasible in the Kistna district, and the matter has been ordered to lie over till more time is at my disposal, when it is hoped that it may be possible to obtain results commensurate with the expense that may be incurred.

35. *Linseed.*—Some interesting results of an examination of the oil extracted from a quantity of seed obtained from Bellary and Kurnool were published during the year. The oil was expressed in a regular oil press and then examined by the Chemical Examiner and compared with some oil imported from England. The result was that the drying quality of the raw Indian and imported oils was nearly the same, there being a slight difference in favor of the imported oil, whilst the boiled oils showed no perceptible difference in their drying quality. Arrangements have been made to obtain a small quantity of Baltic seed for experimental cultivation, with a view to testing whether the climate has anything to do with the difference in the character of the oil produced from Indian and Russian linseed. Samples of the oil expressed from Indian seed have been sent home for valuation. The value of Indian linseed is, however, already well known at Hull.

36. *Wheat in Madras.*—Excluding the Nílgris, this crop is only grown at present to any appreciable extent in the Ceded districts, in Kurnool, Kistna and Coimbatore; Bellary, Kurnool and the Kistna growing the most, but in neither one of them has 8,000 acres of the crop been raised in recent years. This shows how small a proportion of the cultivated land is sown with this crop, and this appears to be probably due to a belief amongst the ryots, which prevails in Kurnool, that the crop is most precarious and very liable to disease or blights and in fact that they can never count on any outturn till the crop is fully harvested. There seems to be very little prospect of increasing the area under this crop in our southern districts, so as to produce it in quantities sufficient for export.

37. *District Crop Experiments.*—The chief feature of the year in this matter was the experiments made with English and Punjab wheat and barely on the Nílgiris alluded to in paragraph 95 of the last report under the supervision of the department.

38. A special detail report has been submitted on these experiments, but I may summarise the results briefly here. As noted last year, nearly all the English seed wheat imported turned out to be bad. The small quantity sent to the Nílgiris evidently belonged to a slow-growing winter variety and it tillered freely and did not do much more. The ryots in consequence came to regard it as a "sort of grass," and would take no care of the crops and consequently no results were obtained from it. The Inspector, who was detailed for charge of the experiments, had left the hills before it showed any signs of flowering, but the Collector subsequently reported that the plants in every case withered away without producing any ears.

This confirms the view I held last year that it was a mistake to experiment with slow-growing English wheats.

39. The Punjab red wheat turned out to be bad seed and so was a failure. The white wheat on the other hand grew fairly well and produced larger and finer ears than the indigenous variety, though it did not mature quite as rapidly. Some of the produce was ground and made into bread in Madras. The flour produced was of good color, but was not suitable for making bread. The bread baked was very bad in appearance, as the proportion of soojee turned out from the wheat was very low and the dough would not "rise." The following table shows the outturn obtained from this wheat and that usually obtained from other wheats at the Government Bakery, Madras:—

Sort of wheat.		Flour.	Soojee.	Coarse flour.	Bran.
Punjab white, grown on the Nílgiris		44·21	21·05	5·26	29·47
Ordinary Commissariat supplies of soft wheat	Doodiah ..	57	30	3	10
	Ganjagelly ..	48	38	2	12

The soft wheats do not by themselves produce enough soojee for bread-making in India. In this case the outturn was very low also. The proportion of bran was very high, partly probably owing to the Nílgiri soils not being well suited to the crop and possibly in part to the crop having been reaped too early.

The experiments are not conclusive against further experiments being made to introduce wheat on the Nílgiris, but it appears that, if further experiments are to be tried, they should be made with some of the hard wheats. If any varieties can be found to succeed, the consumption by the troops and other bread-eaters on the hills will secure a market, and the ryot will be able to undersell the wheat brought from a distance, which now has to bear heavy charges for carriage.

40. The barley experimented with was both English and Punjab. The former grew well in most instances, developed good ears and yielded a fair sample of grain which has been readily purchased by the Nílgiri Brewery Company, and the ryots are reported to have reserved supplies of seed for sowing during the current year. It also appears evident that barley rather rapidly deteriorates on the Nílgiris and thus the continued introduction of fresh seed from time to time is desirable. The Punjab barley did not succeed nearly so well as the English, At starting it looked as promising, but dry weather followed and then it fell off, and in the succeeding heavy rains it suffered still more, so that the best crops only yielded a fair outturn.

In the following table some interesting figures regarding these barleys are shown:—

Description of barley.	Weight per measure.	Relative weight.	Grains per tolah.	Relative number of grains.
	TOLAHS.			
English	52·5	104	289	83
Punjab	43·5	86	373	107
Beer gánji	50·3	100	348	100
Indigenous	35·3	70	461·5	132

The Punjab barley was thus 14 per cent. lighter per measure than the crop the ryots already have, and it seems useless to make more attempts to introduce that variety. The indigenous barley shows how the crop can degenerate. It is believed to have been introduced many years ago by the late Mr. John Sullivan and the grain is now chiefly husk. The "beer gánji" is believed to be descended from seed introduced not many years ago to obtain locally-grown barley for brewing.

41. The experiments were watched by an Agricultural Inspector belonging to this department for six months of the year and are the first ever carried out in the presidency by the ryots with any attempt at continuous supervision.

42. Regarding other crop experiments, it is impossible at this date to report much, as the district reports have not been received. The following amounts of seed

were sent out during the year, and it has been decided to greatly restrict distribution in the future, it being evident that such experiments as have hitherto been usually conducted have been nearly valueless :—

3	lb. Carolina paddy.	43	lb. Upland cotton seed.
66	,, Red wheat.	40	,, Nankin do.
70	,, White wheat.	20	,, Hinginghaut cotton seed.
1,645	,, English wheat.	$1\frac{1}{4}$	,, Indigo.
175	,, Maize.	13	,, Tobacco of sorts.
77	,, Amber sugar-cane.	$2\frac{1}{4}$	,, Divi-divi.
20	,, Chinese sugar-cane.	340	,, Manilla hemp shoots.
$20\frac{1}{2}$	,, Black cholum.	32	,, Guinea-grass roots.
$3\frac{1}{2}$	,, and 14 packets of Eucalyptus seed.	$1\frac{1}{4}$	,, Nanal grass seed.
258	,, New Orleans cotton seed.	$14\frac{1}{4}$	oz. Melon seed.

43. As the reports regarding the seeds have not yet been received and cannot be reviewed without delaying this report, I have only to mention a few results which have been submitted since the date of the last report.

From Ganjam it was reported that the Eucalyptus tried at Parlákimedi died off soon after germination. In Salem, as careful experiments as possible appear to have been made with the same plants, but only at Námakal, where the variety is not stated, and at Hosúr with *E. Rostrata* some success was attained, the general failure being attributed to the want of resident agency to attend to the experiments.

Mr. Lee Kirby, of Coonoor, reports that his experience there has been that for "feeding cattle and making hay nothing is so productive as oats, as, if the supply is too large, hay can be made of what is not wanted." As it is probable that the Badagas would find a market for the crop either as a fodder or as a grain crop, it appears very desirable to encourage them to grow it.

Mr. A. Sabapathy Mudaliar, of Bellary, reported during the year the results of his experiments with various varieties of cotton which he had tried in that district, and of all sorts he says that the Broach seed gave the best results, the outturn of cotton-in-seed being nearly double that of the indigenous sort, and of cleaned cotton 30 to 33 per cent. of the kappas to 25 per cent. produced by indigenous sorts, whilst the quality was much superior. These experiments were made in 1882, and have led to a brisk demand for locally-grown seed of this variety, and Mr. Sabapathy Mudaliar estimated that 20,000 acres were sown with the seed last year. It is to be feared, however, that last year's unfavorable season for cotton will much discourage the ryots in taking up this new variety. Mr. Sabapathy Mudaliar concludes by saying that regarding this variety he thinks—

"I. That it is well adapted for the soil of this district and will produce a better crop both in quantity and quality than the indigenous seed.

"II. That to give the best results it requires more moisture and earlier planting, say beginning of August, and that it also requires to be more thinly planted to give it room to spread."

VI.—The improvement of our Live Stock.

44. There is not much to be said under this head this year. The year has been one of waiting for opportunities, which at length came towards the end of the year, after overcoming numerous difficulties. A site has been found and can be secured if Government approve for the stock depôt referred to in paragraph 25 of the last report. It lies not far from Hosúr on the Mysore plateau in the valley of the Poniar, which furnishes it with a supply of perennially flowing water. The country is not rich, nor is the land obtained, but it is hoped that, with the area obtainable, it may be possible to make a good beginning both in cattle and sheep-breeding.

45. As directed by Government, I refrain from entering on any details as to the herd and flock at present owned by the department, but may mention that, on the 1st September last, the following were handed over to the Educational Department for the annexé to the College of Agriculture at Saidápet :—

Cattle.		Sheep.	
Cows	2	Rams	2
Calf	1	Ewes	10
Heifer	1	Lambs	10
Young bull	1		
Bulls	3		
Working cattle	2		

At the end of the year the stock belonging to the department sootd as follows :—

Cattle.		Sheep.	
Cows	6	Rams	37
Bull	14	Ewes	45
Heifers	5	Gimmers	13
Bulls calves	6	Ram lambs	10
Heifer calves	2	Ewe lambs	8

No serious attack of disease occurred in either the herd or flock during the year.

46. I have not again attempted to collect information as to the stock distributed such as was given in paragraphs 45 to 47 of my last report, and shall only note my observations of such as I personally inspected during the year. In June, I saw the two bulls now in charge of Mr. Little at Karúr, and both were in good condition, and, I hear, continue to do well. In August and again in March, I inspected the stock on the Madura farm ; on both occasions the Government bull and rams were looking well, far better than those of the Farmer's Club, but they were doing no good there, as there services were not being utilised in any way. In February I visited the Eurasian settlement at Whitefield and saw the bull sent there last year ; he looked well, but perhaps a trifle overfat.

Since the close of the year under report, I have heard of the death of the Aden cow sent to Dr. Shortt in 1885, and also one of the cows sent to the Madura farm.

The Collector of Coimbatore indented, during the year, for an Aden bull, but his wish could not be complied with at the time. Two bulls of that breed were, however, sent up to the Erode show, but, as they did not meet with the approval of the people generally, as far as the Collector could ascertain, they were brought back again.

Two Aden bulls were presented to the Zemindar of Punganúr during the year under the orders of Government. One bull sent to South Canara in October 1885 was omitted from the enumeration made of animals distributed in the last report.

47. The question of the continued retention by Government of the Amrhat Mahal cattle in the Madura district (now in charge of private individuals) came up during the year, and it was recommended that they should be disposed of in the neighbourhood to several gentlemen who promise to allow the services of the bulls free for all cows that may be brought to them. It was not considered worth while to retain the animals pending the opening of stock depôt ; as, if it is then desired to breed from the Amrhat Mahal blood, it will be better to go to the original source and obtain fresh animals.

48. Regarding the rams referred to in paragraph 47 of the last report, I can only make the following notes. One of the rams sent to Erode died towards the end of July ; those with Mr. Little continue to do well ; three sent to the Madura district were found standing at the Madura farm doing nothing, though looking well, at the time of both my inspections.

49. *Fodder*.—The increased supply and the improvement of the quality of this lies to a great extent at the root of the problem of live stock improvement in Southern India. Aside of the questions of breeding from immature and badly-formed animals of both sexes, and of the total neglect of breeding cows in far too many cases, unless adequate supplies of good fodder are to be had at all times of the year, no young stock can develop thoroughly. The influence of food on development is wonderful, and I recently observed a marked instance of it in the Kurnool district. There, in the Cumbum and Márkápur taluks, the soils are generally poor and thin, and the rocks from which they are derived poor also. In these taluks Nellore cattle can rarely reach a live weight of 700 to 800 lb. In the Nandyál valley, on the rich black-cotton soil, the same breed fed on the jonna (*sorghum*) straw grown there, and carefully

tended, develop to weights of fully a 1,000 or 1,200 lb. These are working weights. The value of natural fodder depends to a great extent on the quality of the soil on which it is raised and on its power of furnishing to the plant stores of those materials required to build up the animal frame. Lime is plentiful in the " cotton soil " of the Nandyál valley.

No one who has travelled about the country can help being struck with the enormous quantities of fodder which go to waste annually. In many places there are large areas of waste land producing grass, poor most often it is true, which if cut at the proper time and stored would form a valuable reserve in the hot season, or in times of drought. All along the foot of the Nallamalais in the Nandikótkur and Nandyál taluks of Kurnool are large tracts of open jungle producing large quantities of grass, and thousands of tons go to waste there annually. Why should not this be preserved as a fodder reserve for times of drought and famine, when fodder of any sort rises to a fabulous value, and the want of it destroys thousands on thousands of valuable stock? In some places great stores of hay or silage could be made within easy reach of water carriage (the Kurnool canal) which would enable it to be distributed over a wide area of country, all the way down to Cuddapah, at a small expense.

In such a locality as the above, experiments in the process of ensilage could be conducted with a hope of some valuable results. No one doubts that silage can be made, and made cheaply in India, if adequate supplies of green fodder are forthcoming. It has to be proved whether the process is better or cheaper than making the same fodder into hay, under condition such as we often meet with in this part of India. The comparative value of silage and good hay made from grass of the same quality is still a moot point, and no experiments have, as yet, been started, nor are indeed possible in this part of India which are likely to solve this question. Experiments on a large and extended scale in the making of silage were entrusted to a number of picked officers during the past year, but as yet no results have been received.

50. *Indigenous Breeds of Cattle.*—During the year the Director submitted to Government an abstract of the result of inquiries set on foot in May 1885 regarding the breeds of cattle found in the different districts of the presidency, and the reasons for their degeneracy. The result appears to be that the poor cattle found in so many parts of the country are the result of the use of bad sires, too close interbreeding, and of breeding from immature animals. It also appears probable that the use of paddy straw, as the chief fodder for cattle in some places, results in deterioration in their size. The customary fodder also appears to have some effect on the color as well as on the development and character of the cattle raised in any locality.

It is now proposed to pursue the subject further, and

(i) to procure analyses of the different kinds of fodder commonly used ;

(ii) to collect information regarding each taluk of the same description as has already been furnished for whole districts ;

(iii) to, as it is now known where special breeds of cattle are to be found, direct the Inspector of Cattle Diseases, when on tour, to visit the localities where they exist, and to draw up a professional description of each breed, taking photographs of typical animals—a work which Mr. Mills has been good enough to offer to attempt.

A series of queries has been prepared and circulated with a view to collecting the information referred to in (ii). These are given in appendix I to this report.

51. I received during the year an interesting inquiry from America where, in the Southern States, Indian cattle are apparently much appreciated by some breeders for their docility, milking and beef-producing qualities, and especially for crossing on the common " scrub " cattle usually raised. What particular Indian breeds have been imported into America is not clear, as all are usually called " Zebus " or " Brahmins," but the fact remains that they are considered to make a good cross on the coarsely-bred cattle so common in many parts of America, which are undoubtedly of European origin. The question of attempting the improvement of our Indian breeds by the reverse process came up during the year, but it was apparently decided that the time for doing this had not yet arrived.

VII.—Miscellaneous.

52. *Collection of Native Implements.*—Nothing has been done in this matter referred to in paragraph 96 of my last report, although proposals as to what could be done were submitted for approval.

53. *Library.*—Steps are being taken for the formation of a library for the use of the department at Chepauk, the inconvenience of having to refer to the library at the Agricultural College having been found too great. It is hoped that many books, the original property of the office of the Superintendent of Government Farms, which were deposited in the College library, may be recovered for the use of the department. During the year the supply of newspapers for the use of the department was largely increased and is now fully adequate. Numerous exchanges from various departments in India, and from public bodies and societies abroad, were added to the library during the year.

54. *Agricultural Sheets.*—The difficulty about the translation of these has been got over, and numerous papers were issued for publication during the year.

55. *Establishment.*—The work of the Agricultural Inspectors has already been referred to. My office has not yet been absorbed in that of the department, and, as far as can be seen, not much saving of labor has been effected by bringing it to Chepauk. There was a very large and natural expansion of clerical work during the year, but it has been entirely departmental, correspondence with the public having dwindled down during the past four years to an infinitesimal amount. Only the addition of the late Saidápet Farm Storekeeper to the clerical force of my office allowed of the work therein being got through at all. During the year the whole of the establishment suffered greatly from its exposure in Kurnool and the continual travelling it had to perform. At the end of the year, of the three clerks on the permanent establishment, only one was present, and he had been absent, owing to fever contracted in Kurnool, for the greater part of the year; the other two were absent owing to ill-health. The peons and lascar attached to the office were nearly worn out in the discharge of their duty and in that respect the establishment is inadequate. The service books of all officers have been written up to the 1st of April.

56. *Finances.*—The following is a summary of the expenditure for agricultural services during the past three years; details will be found in appendix II :—

Items.	1884-85.	1885-86.	1886-87.
	RS.	RS.	RS.
Receipts—			
Provincial grant	2,000	2,000	2,000
Surplus Pound Fund	32,318	42,311	..
Departmental receipts	4,387	3,623	3,183
Total ..	38,705	47,934	5,183
Expenditure—			
General charges	15,374	13,399	14,385
Saidápet Experimental Farm	7,483	4,918	1,704
Estate charges and improvements	1,283	77	..
District operations	2,644	5,501	7,023
District analyses	..	..	5,354
Stock-breeding	..	..	787
Pony-breeding	..	692	5,261
Cattle-disease inspection	28,008	33,623	39,418
Total ..	54,792	58,210	73,932

It will be seen that the receipts on account of the Saidápet farm and the live stock of the department were considerable, partly owing to the selling off of condemned and useless stock on the closing of the Saidápet farm. The growth of expenditure is almost entirely due to the development of the veterinary branch of the department. The heavy charges under district operations were caused chiefly by the purchase of seed, wheat and barely for experiment on the Nílgiris. The sum debited to the Saidápet farm is really chargeable to stock-breeding.

The charges incurred on behalf of exhibitions are not shown in this statement, as they are met by a special provincial grant for the purpose.

No mention has been made in this report of the pony-breeding operations in Coimbatore and Salem, as they are at present under the joint supervision of Mr. Mills and the Collectors.

APPENDIX I.

Memorandum of points on which information is being collected regarding Cattle.

I.—The Cattle bred in each Taluk.

1. Are there any distinct breeds? If so, by what names are they known and in what parts of the taluk are they bred?

2. What is the
   (*a*) character,
   (*b*) size,
   (*c*) color,
by which the several breeds are distinguished?

3. Are the cattle good
   (*a*) for draught purposes, or
   (*b*) as milch cattle?

4. If for draught purposes, are they suitable for fast or slow work?

5. Are the breeding stock dependent on
   (*a*) grazing, or
   (*b*) other fodders?

6. If other fodders are used, what is the commonest, and when is it supplied?

7. Is any, and what, extra food given to
   (*a*) tilling cattle,
   (*b*) draught cattle,
   (*c*) cows,
   (*d*) young stock?

8. (*a*) Is any care bestowed in the selection of bulls for breeding?
   (*b*) If not, is any control exercised over breeding?
   (*c*) At what age are young bulls castrated, and how?

9. Is any shelter provided for cattle? If so, what is its character and for what class of stock is it provided?

10. (*a*) At what season of the year are calves annually dropped?
    (*b*) For how many years, and how frequently, do cows usually drop calves?
    (*c*) After the calving season, is the supply of pasture or other fodders usually sufficient?

11. (*a*) Are cows usually milked?
    (*b*) If so, how much do they yield daily, and for how long after calving?

12. (*a*) Are cattle extensively exported?
    (*b*) If so, at what age?
    (*c*) To what place or places?
    (*d*) By whom is the trade carried on?
        (*a*) By local dealers, or
        (*b*) By dealers from a distance?

13. What is the local value of
    (*a*) a draught bullock?
    (*b*) breeding cow?
    (*c*) young stock when sold by dealers?

14. Make also any general remarks which may strike you regarding the causes of the degeneracy, if any, of the stock, and the practices of breeders. Also note the views of experienced breeders and ryots as to the cause of degeneracy.

II.—Imported Cattle.

1. Are any cattle imported into the taluk, and to what extent?
2. Of what breeds are they, and in what parts of the taluks are they found?
3. Are they suitable for
   (*a*) draught, or
   (*b*) dairy purposes?
4. Whence are they imported and by whom, and at what time of the year?

5. (*a*) Are there any local cattle fairs held? If so, when and where?
(*b*) What breeds of cattle, and how many of them are brought for sale there?
(*c*) Whence are they brought?

MADRAS,
25th January 1887.

(Signed) C. BENSON, M.R.A.C.,
Assistant Director of Agriculture.

APPENDIX II.

STATEMENT OF ACCOUNT FOR AGRICULTURAL SERVICES DURING 1886-87.

				RS.	A.	P.
I. General charges—						
Establishments	10,776	4	5			
Travelling charges	2,677	2	6			
Contingencies	931	7	3			
				14,384	14	2
II. Saidápet Experimental Farm—						
Cooly labor	691	13	10			
Implements and machines	42	2	4			
Live stock	930	12	8			
Seeds	13	0	0			
Manures	4	8	0			
Contingencies	21	11	3			
				1,704	0	1
III. District operations—						
Exhibition of improved ploughs ...	417	3	10			
Improvement of agriculture and trade	5,158	7	0			
Distribution of seeds	447	9	2			
Madura Farm Superintendent ...	600	0	0			
Do. petty constructions and repairs	400	0	0			
				7,023	4	0
IV. District analyses—						
Agricultural inspectors	2,798	0	0			
District analyses clerks	1,740	0	0			
Travelling charges	739	14	6			
Contingencies	75	11	9			
				5,353	10	3
V. Stock-breeding—						
Maintenance of herd				786	13	7
VI. Pony-breeding				5,261	1	3
VII. Cattle-disease inspection				39,417	14	0
Grand Total ...				73,931	9	4
Income—						
Saidápet Experimental Farm—						
Farm produce	1,169	10	6			
Implements and machines	612	8	0			
Sale of live stock and produce, &c.	749	8	10			
Sundries and recoveries	104	4	8			
				2,636	0	0
Surplus Pound Fund				...		
Grant for improvement of agriculture and trade ...				2,000	0	0
Cattle-disease inspection				546	9	3
Grand Total ...				5,182	9	3

MADRAS,
10th June 1887.

(Signed) C. BENSON, M.R.A.C.,
Asst. Commr. of Land Records and Agri.

To the Commissioner of Revenue Settlement, Land Records and Agriculture.

MEMORANDUM.

In continuation of paragraph 31 of my annual report, I submit the following in reference to report received from the Madura Farmer's Club regarding the work of the farm in 1886-87.

2. *Financial.*—I annex statement showing the receipts and expenditure of the farm for the past two years, from which it will be seen that the net farm income for the two years was Rs. 499-1-2; but some of the expenditure during the period was debitable properly to capital, and, without valuation statements at the beginning and end of the period, as well as statements of liabilities and assets, no complete statement of account can be made out.

3. During the same period the Farmer's Club received Rs. 5,330-2-2 from outside sources and expended the following sums:—

	RS.	A.	P.
Agricultural exhibition	1,028	0	0
Buildings	1,905	4	2

so that Rs. 2,396-14-1 should have been added to their funds during the period in addition to the sum realised from the farm. Of the condition of the funded capital of the Club, I have no knowledge, and it does not concern this department.

4. *Season and Crops.*—The report furnished does not add much on this subject to what I noted in my annual report. The season was very unfavorable. The total area planted or sown with crop was 41·13 acres, of which 7·72 acres failed, 13·55 acres of horse-gram were ploughed in and 5·01 acres were standing at the close of the year, so that only 15·85 acres of crop sown were successfully harvested during the year. The report, however, shows the following areas to have been harvested:—

	ACS.			Yielding per acre.
Fodder crops	6·32	11,652	lb.	green fodder.
Paddy	1·36	724	„	grain and 2,500 lb. straw.
Maize	·48	161	„	grain and 4,608 lb. straw.
Cholum	4·86	239	„	grain and 6,753 lb. straw.
N. O. Cotton	1·	718·5	„	cotton-in-seed = 225 lb. lint.
Nankin cotton	·40	79	„	cotton-in-seed.
Tobacco	2·27	605½	„	cured leaf.

Barley, exotic tobacco, and divi-divi were also experimented with; the two first without success, but the divi-divi plants are promising and arrangements are being made to test the pods in local tanneries.

5. The only crop of any peculiar interest is the tobacco. In this case a native variety called *Usikappal* was grown, which is regarded as one of the best grown in the Madura district, and with the produce various drying experiments were tried as follows:—

The experiments were begun on the 8th January last when three sections of the crop were cut and treated as shown below:—

No. 1.	No. 2.	No. 3.
Cut at 4 P.M., left on the field till next morning, carried to shed before 7 A.M., and the whole plants hung in rows 2 feet apart. The plants were reversed daily and hung in all for 20 days. The shed was very open and the weather dry, with heavy dews in the mornings. On the 28th January the plants were taken down and heaped for fermentation, which process was continued for 23 days, the heaps being turned five times. The leaves were then stripped from the stems, tied in bundles of about 1 lb. weight each, and again bulked for 18 days, during which period they were turned four times.	Cut as No. 1, and left on the field for 3 days according to the native practice. Then hung in rows in the sun for 16 days and then bulked under cover for 25 days with 5 turnings. The leaves were then stripped and again bulked for 14 days with 4 turnings.	After cutting as No. 1, the leaves were stripped from the stems at once, taken to the shed and hung in rows. These rows were daily turned. In 16 days the leaves were dry and were taken down, tied in bundles and bulked. The leaves were then a pale green. Fermentation was continued for 34 days, the heap being turned 9 times.
The leaf is reported to have a mild flavor.	Flavor said to have been strong.	Flavor said not to be very strong.

Samples of the leaf have been forwarded, and I recommend that a professional opinion be obtained on the bulk. No details have been furnished as to any sales.

6. *Live Stock.*—The outbreak of foot-and-mouth disease caused a good deal of trouble amongst the cattle, but no deaths, although one of the Government Aden cows has since died from debility, probably resulting from the attack.

The Amrhat Mahal bull died on the 3rd April 1886 and one cow was lost during the year. The health of the sheep flock was very bad, 30 having died out of a flock of 199, and 144 were sold to reduce the stock. The milking cows and working cattle get a fair ration of artificial food; but dry cows, young stock, and calves for a considerable portion of the year got nothing besides their fodder. The sheep had to trust to grazing entirely.

7. The experiments in feeding dairying cattle are summarised in the following table. Begun in July 1886, they were suspended and resumed again in January :—

—		Milk, total.	Butter, total.	Per measure of milk.	Ghee, total.	Per lb. of butter.	Food per head.	Remarks.
		M. O.	LB. OZ.	OZ.	LB. OZ.	OZ.		
July 1886 ..	2 Cows ..	72 6½	15 4¼	3·4	9 11½	10·1	High ration— 4 lb. cake, 2 measures dholl husk. 1 lb. rice bran and 1½ oz. salt. 40 lb. green fodder and grazing for 7 hours on guinea grass.	Calves about 8 months old.
	1 Buffalo.	47 0	18 13½	6·4	13 6¼	11·4		
January and February 1887.	2 Cows ..	222 4	38 0½	2·7	22 4¾	9·4	Low ration— 2 lb. cake, ½ lb. rice bran. 2 measures dholl husk, ¾ oz. salt. 20 lb. straw, grazed 7 hours.	Calves about 14 days old at commencement.
	1 Buffalo.	125 2	33 6¼	4·3	20 2½	9 6		
March and April 1887.	2 Cows ..	204 3	43 9	3·4	24 14	9·1	High ration— 4 lb. cake, 1 lb. rice bran. 2 measures dholl husk, 1½ oz. salt. 40 lb. paddy straw; grazed for 7 hours.	The same cows as were fed on low ration in January and February.
	1 Buffalo.	89 0	26 5½	4·7	15 15	9·7		

The results recorded in July show that under similar conditions buffalo milk yielded nearly double the quantity of butter given by cow's milk, and that this butter also contained more ghee. The further results obtained later in the year are somewhat similar, but apparently the buffalo cow required richer food to give such a proportionately high outturn of butter and ghee than was fed to her in January and February, whilst on return to liberal food in March and April she did not show the same recovery in quality of milk as the cows. The low feeding of the cows after calving, as might be expected, permanently affected their yield of milk. One of the cows experimented with was an Aden and the other an ordinary country cow, and the milk of the former throughout was at least 15 per cent. richer in butter than that of the latter.

During the year the cows on the farm gave milk as follows :—

Breed of cows.	Average milking period.	Average yield. Total.	Daily.
		MRS.	MRS. OLL.
3 Adens	279 days	546·3	2 0
13 Country cows ..	239 ,, ...	328	1 2
4 Buffaloes .. .	339 ,, ...	522·7	1 4

It will be noted that the buffalo cows gave milk for nearly a year after dropping their calves, but their total yield was less in that long period than that of the Adens. The latter gave the best daily record and the milking periods were of good length, whilst the intervals before they again began to yield milk only averaged fifty days. The ordinary native cows gave a lower daily record even than the buffaloes, for the shortest period of either, and in the case of six the interval during which they were dry averaged 152 days. None of the average or total yields are remarkable, though that of the Adens is fair for the period. The yield is in each case noted in Madras measures of 8 ollocks or 100 cubic inches each.

8. The 2 Aden bulls standing on the farm served—one 19 cows, of which 17 successfully, and the other 4 cows, of which 3 successfully. These results are not at all satisfactory, and it is evident, as I pointed out to the Director in August last, that one of the bulls is doing no good on the farm. He was sent to the Madura district to be used under the Collector's orders. The same remark applies to four rams also standing at the farm.

9. It is reported that the Beheea sugar mill and several other machines and implements have been exhibited in the town during the principal festivals. The American sickle has been found to be much superior to that in common use, and is appreciated by the coolies. Double mhotes are in constant use on the farm, and an experiment was made in the use of steam power for raising water, but the cost of fuel was found to be prohibitive.

STATEMENT OF ACCOUNTS of the Madura Farm for the years 1885-86 and 1886-87.

—	Receipts.		—	Charges	
	From farm.	From other sources.		Of farm current.	For other purposes.
1885-86.	RS. A. P.	RS. A. P.	1885-86.	RS. A. P.	RS. A. P.
Live stock	1,194 15 8	..	Live stock	593 10 0	..
Farm produce	257 1 7	..	Manure	19 1 4	..
Implements	35 1 0	..	Seeds	4 9 0	..
Sundries	758 9 7	..	Labor	748 7 3	..
			Implements	64 14 9	..
Subscriptions and donations	..	3,672 14 0	Repairs	34 9 8	..
			Sundries	25 11 7	..
			Exhibition	..	1,028 0 0
			Buildings	..	368 10 8
			* Do. unsettled advance ..	..	1,000 0 0
Total for the year ..	2,245 11 10	3,672 14 0	Total for the year ..	1,490 15 7	2,396 10 8
1886-87.			1886-87.		
Live stock	1,765 3 5	..	Live stock	985 13 1	..
Farm produce	72 5 11	..	Manure	1 1 6	..
Labor	163 11 6	..	Seeds	33 3 2	..
Sundries	130 11 0	..	Labor	750 9 5	..
Interest	..	757 4 3	Implements	321 15 9	..
			Sundries	118 6 9	..
			Repairs	176 9 3	..
Government contribution for exhibition held in 1885-86	..	500 0 0	Buildings, viz., tobacco		
Do. for tobacco shed..	..	400 0 0	shed and store-room ..	..	536 9 6
Total for the year..	2,131 15 10	1,657 4 3	Total for the year ..	2,387 10 11	536 9 6
Grand Total ..	4,377 11 8	5,330 2 3	Grand Total ..	3,878 10 6	2,933 4 2
			Net farm income for two years	499 1 2	..
			* Net capital to be accounted for	..	2,396 14 1
	4,377 11 8	5,330 2 3		4,377 11 8	5,330 2 3

* Neither of these sums have been accounted for, nor have we any information as to the further liabilities of the farm.

ANNUAL REPORT OF THE INSPECTOR OF CATTLE DISEASES.

The three probationers remaining under training last year have been promoted to the grade of local inspectors. Two probationers were admitted, one was requested to resign and the other is still under training. The strength of the department on the 31st March 1887 was as follows :—

Inspector	1
Deputy Inspector	1
Local Inspectors	18
Probationer	1
Total ...	21

2. Local Inspector M. Bhavani Shunker Row resigned, Local Inspector M. Narrayan Row was transferred to the Educational Department as third Assistant at the College of Agriculture, and Local Inspector M. Swernalinga Naicker was dismissed. B. Venkata Dasapah, a Mysore State Veterinary student, was given a direct appointment.

3. *Inspections.*—G.O., No. 3881, Revenue, dated 1st July 1886, gave me from 1st July to 31st December for mofussil inspection during which time I visited the district of Coimbatore (twice), Tanjore, South Arcot, Bellary, Anantapur, Kurnool, Cuddapah, Malabar and South Canara.

4. *Deputy Inspector.*—On Mr. Shunker, the Deputy Inspector, resuming work after his leave on the 5th July, he was permanently posted to take immediate charge of the pony-breeding operations in the Coimbatore district, where he worked until 25th January 1887. He was then transferred to the Salem district to look after pony-breeding and castration there. He proceeded to Bombay on the 8th December 1886 for the purpose of purchasing stallions for Government and returned on the 24th December 1886.

5. *Local Inspectors.*—The local inspectors have, with the exception of one or two, given me satisfaction.

6. *Probationers.*—The probationer now undergoing training has up to date done well. For number of inspections made and districts visited, see appendix No. 1.

7. *Hospital.*—Farrier Havildar Fernandez, who was in charge of the hospital, was transferred back to his regiment on the 1st June 1886, and Mr. Borthwick, from His Highness the Maharajah of Mysore's Breeding establishment, was entertained to fill his place, and has given every satisfaction.

8. The admissions to the hospital during the year amounted to 198 as against 339 in the previous year, showing a falling off of 141 cases ; this I can only account for owing to my prolonged absence from head-quarters on tour, viz., six months, and to the fact that no serious outbreaks of disease occurred in the vicinity of the hospital or on the farm as was the case last year. The percentage of deaths on admissions was 11·61 or 0·87 less than in the previous year.

9. Seven castrations were performed, all of which were successful. A case of traumatic tetanus was successfully treated. The hospital buffalo died from the bite of a cobra.

For particulars of admissions, &c., see appendix No. 2.

10. *Act No. IV of* 1879.—No animals were admitted under this Act.

11. *Pharmacy.*—Twelve thousand five hundred and twenty prepared doses of medicines were despatched to the districts as against 7,318 in last year, in addition to a large quantity of drugs in bulk, besides disinfectants. The medicine supplied by the department continues to give every satisfaction.

12. *Office.*—The work of the office continues to be very heavy and increases year by year.

13. *Financial Statement.*—The estimated budget grant for the official year 1886-87 was Rs. 37,800, expenditure Rs. 38,639-15-4 ; the sum of Rs. 839-15-4 were spent in excess of the grant.

14. The receipts on account of treatment of cases, &c., have been Rs. 546-9-3 as against Rs. 562-14-9 in the previous year, a decrease of Rs. 16-5-6.

For particulars of expenditure, &c., see appendix No. 3.

15. *Educational.*—The students at the College of Agriculture have done fairly well. A dissecting-room has not yet been supplied for the use of the students.

16. *State Students.*—The student from Travencore still continues his studies. The Vizianagrum student after undergoing one year's training has gone home.

17. *Salustries.*—Two Mahomedans were sent by the Transport department for the purpose of being trained as salustries. One of the men has turned out very well indeed, but the other was found unsuitable and was requested to leave.

18. *Protective inoculation for Anthrax.*—No further experiments have been conducted as I consider all that could be done has been done by this department, and until a local laboratory has been established for the manufacture of a safe and reliable anthracine, no more steps in the matter are, in my opinion, necessary.

19. *Pony-breeding.*—The number of coverings for the year by all the stallions, both in the Coimbatore and Salem districts, amounts to 101.

20. The number of foals dropped were 11—10 in Coimbatore and 1 in the Nílgiris. Seven were got by the late stallion "Mahadi" and 4 by "Parfait Amour." Peculiar to say no less than 9 out of the 11 foals are fillies.

21. *Castration.*—Mr. Shunker, the Deputy Inspector, has castrated during the year 83 ponies, and not a single death has occurred, which is most satisfactory. The people are reported to be taking well to this new scheme of castration, which is a favorable sign, as it lies at the root of scientific pony-breeding and must in time show good results by the weeding out of worthless sires.

22. *Agricultural Exhibition.*—At the end of March I attended the Gooty Agricultural Exhibition in my capacity as Inspector of Cattle Diseases and as a judge of ponies and cattle.

23. *Section A, Group I.*—Thirteen animals were exhibited under this group—1 galloway stallion, 6 pony stallions, 1 pony gelding, 3 pony mares, 1 mule and 1 ass stallion. Taken as a whole, they were by no means a good lot, and the only prizes which were awarded were 1st prize for galloways, a 2nd and a special prize for ponies. The mule got a special prize and the ass stallion 2nd prize.

24. The mule was a good specimen, out of a very fairly made country bred bay mare, got by one of the Government stallion asses, but which one I failed to find out from the owner. He belonged to Rámallakót taluk, of the Kurnool district, so, I presume, it must have been "Guznee." Be that as it may, the mule will in about another year make a capital transport animal. He was sound and well put together.

25. *Group II—Bulls.*—The stock under this group were a grand show—bulls, Nellore breed, 45; other breeds, 35. Better bulls could not be wished for than most of the Nellores exhibited, but there were many points they would stand improvement in; notably the feet are much too small for such large superstructures; this was shown in many cases by their arriving at the show foot-sore and dead-lame; they are also deficient in rib, and narrow across the pelvis; the hocks too are short, flat and weak; in fact, the shortness of the os calcis in several animals almost amounted to a deformity, all defects which might in time be rectified by judicious breeding. It could be particularly noticed that, although there was hardly a fault to find with the imposing head and fore-quarters of these fine bulls, still there was always a feeling of disappointment when one began to scan them behind the hump.

26. *Other Breeds.*—Some of these bulls were fair specimens, but were much smaller and not up to anything like the Nellores.

27. *Cows and Heifers.*—Twenty-one were shown, all of the Nellore breed, and with only a few exceptions, all came from the Ongole taluk. I cannot speak too highly of them, as all round they were an excellent lot; in fact, it was a most difficult matter to award prizes. Taking the points of these cows and heifers into consideration, I certainly think they showed up much better than the bulls; some of them, especially

a red four-year old cow which took 1st prize, a better formed cow for dairy purposes it would be hard to find anywhere; she was broad and roomy with a big well-filled and well-formed udder. The heifers were equally as good as the cows.

28. Amongst the exhibits there was a sheep with six legs, four were in the normal position, but the two extra ones were attached to the integument of the sternum or breast-bone. They performed no functions whatever, *i.e.*, they did not assist or interfere in any way with locomotion.

29. Another freak of nature which I noticed was a hermaphrodite sheep. The male functions seemed to be complete, but the female was only rudimentary and imperfect.

30. *Purchasing Ponies.*—In September I was employed on special duty in purchasing ponies for Burmah.

Cattle-poisoning.

31. Having directed all local inspectors to specially mention cattle-poisoning in their annual reports, I append the information received up to date.

32. I beg to point out that during the official year 1885-86 seventeen cases of cattle-poisoning were included in the district statistics submitted to this office, whereas I find on reference to the report of the Chemical Examiner for the same year that 112 cases were reported to his office which clearly proves that the statistics sent to this office are of little value.

33. *Anantapur.*—" A case of cattle-poisoning was brought to my notice on the evening of the 9th May 1886 from the village of Tadpatri, to which place I proceeded at once and made inquiry about the nature and mode of how they have administered the poison to the animal. The owner expressed his entire ignorance of the matter. I observed the animal protruding its tongue, keeping its mouth wide open and moaning bitterly. No other symptoms were visible than these." The case was successfully treated by the inspector.

34 *Arcot, South.*—" During the official year under report thirteen animals belonging to the people of Maseemanathum, in the Chidambaram taluk, have been poisoned by white arsenic, of which nine succumbed to the effects of the poison and the remaining four are said to have recovered. This practice was commenced by some Pariahs of the surrounding villages who had, I learnt on inquiry, previously entered into a contract with a certain hide merchant living somewhere in the taluk, and who it is reported by the people at large keeps with him an inexhaustible store of the said poison for the purpose of supplying these chucklers. The latter receiving the poison came towards the village in the month of August 1886, and with the assistance of that village toties and certain cow-boys began their inhuman practice. The method adopted by them in giving the poison is to mix it with some flour and water so as to reduce it to the consistence of a paste and rub it on Portia leaves (Pooarasu, *Tam.*) which are rolled and given to the animals by the mouth during the night-time. This is done, of course, by their stealing into the cattle-sheds and administering the poison with the forced consent and assistance of the cow-boys. The animals generally die by the next morning. When some animals died like this, the owners began to inquire into the cause of the sudden deaths among their cattle, there being no disease of any kind at the time, and those animals being, I was told, found completely healthy when brought home the night previous to their death. The clue was found out by the assistance of a cow-boy of a ryot by name Thambusami Oodayar of the village, and then they began to try some antidote which they knew. By this means they declared that they have succeeded in restoring the four animals previously mentioned to health. Then the matter was reported to the village officers, who in their turn brought the same to the notice of the Police officers. In their inquiry it was said to have been clearly proved that these cattle did really die from the effects of poison, the culprits themselves having come forward and confessed that they were the sole cause of this mischief. Further, in their search of the culprits' house a few doses of the poison were found and which were produced by them before the Magistrate as clear evidence. These doses of poison were transmitted by the Magistrate through the medical authorities to the Chemical Examiner to Government, and the latter after a careful examination

writes to say that a considerable quantity of white arsenic has been found in each substance. This case is now pending in the Head Assistant Magistrate's Court."

35. *Canara, South.*—" Every inquiry was instituted with a view to find this out, and as yet I have not come across even one case of criminal poisoning."

36. *Coimbatore.*—" No cases came under his notice during this official year."

37. *Kistna.*—The practice of criminal poisoning does not seem to exist in the district."

38. *Godávari.*—" Cattle-poisoning does not exist."

39. *Ganjam.*—The local inspector under date of 18th September 1886 reports—" The deputy tahsildar of Sómpet mentioned in his season report that 132 animals have died of poisoning in Sómpet."

He went at once to investigate the matter and discovered after analysis that the poison used was some form of arsenic which the following report will show :—

" I proceeded to Sómpet and on inquiring of the deputy tahsildar about the cattle-poisoning, he said that the police had found out a case and sent the supposed poison to the apothecary in charge of Sómpet dispensary. The Senior Assistant Collector, who was then here, ordered the apothecary to help me in supplying all the necessaries that could be obtained from the dispensary for analysis. The apothecary handed over to me a packet containing some white stuff together with some semi-masticated leaves of grass for analysis, and also he informed me that he had tried a little quantity from the packet on a chicken *and that the result was fatal.*

" I analysed the stuff in the presence of the apothecary and found out that it contained some arsenic, which no doubt would kill any animal, and gave a certificate to that effect. The guilty persons have been punished with *six months' rigorous imprisonment.* Not a single death occurred since my arrival here. I have made inquiries in the adjacent villages and the people gave a history of previous deaths, *i.e.*, before my arrival here ; but there are none now. In many of the villages I hear that the zemindars in this taluk are in the habit of giving contracts to some merchants every year for a certain sum, giving them sole power to collect all the hides in their dominions ; and even if the people object to give them, it seems the zemindars force them to do so.

" The contractors in their turn nominate one are two chucklers in each village, or in two or three villages together, to collect all the hides on certain conditions. The larger number of hides they collect the more they will be profited, and whenever the number falls short, these chucklers for their own benefit may try to poison as many cattle as possible. The accused in the Sómpet case is a contractor. So I think that this contract system may be the cause of outbreaks of cattle-poisoning in these parts, and therefore request you will be kind enough to take some measures to prevent it."

Tests he employed.—" I prepared a solution from the contents of the packet—

(1) " I took a little of the solution in a test tube and added to it ammonio-nitrate of silver, which gave a yellow precipitate and was dissolved in excess of ammonia and nitric acid.

(2) " I took a small quantity of the solution in another test tube and added to it ammonia and sulphate of copper solution which gave a precipitate of schulis green.

(3) " I took a clean bottle, fitted to it a thin quill tubing, put some granulated zinc pieces (pure) and sulphuric acid with a small quantity of the solution into the bottle and corked it when gass issued through the tube. I lighted a match at the mouth of the tube which gave a greyish violet flame, then I took a piece of clean paper and moistened it with ammonio-nitrate of silver solution, and held it over the flame, which gave a yellow stain.

(4) " I put a little of the powder (from the packet) over the fire which gave a garlic-like smell."

40. *Kurnool.*—" Has met with no cases of cattle poisoning."

41. *Madura.*—" No cases of cattle-poisoning have been brought to my notice since I joined the district (11th November 1886)."

42. *Malabar.*—" Cases of cattle-poisoning occurred in different parts, but it was difficult to detect them, as the matter came to notice a long time after the disposal of the carcasses."

43. *Nilgiris.*—" Cases of this nature have not come under my notice."

44. *Nellore.*—From the information received at different places during my tour, criminal poisoning is carried on to some extent by chucklers. Only two cases were registered in a village in Rápúr taluk in last September, and how many were left

unregistered in other places I cannot account for. Investigations were made by me to detect the culprit or culprits, but it was impossible to do so, as the villagers never lay any suspicions on the chucklers or Pariahs belonging to their own village."

45. *Vizagapatam.*—"This nefarious practice of poisoning cattle for the sake of their hides by Chammers does no doubt exist to some extent in this district, although no confirmed case has come under my notice. Suspicion was entertained in the village of Nindugonda, of Golgonda taluk, where about eight head of cattle were reported to have died within 48 hours of the attack, which, as far as I could judge from the statement of the curnam, could not be satisfactorily identified with any known contagious disease. There was, however, no evidence whatever to show that the cattle were criminally poisoned. Further, no carcass was available for my examination at the time I visited the village and no further case was reported."

46. *Spreading Contagion.*—The common practice of spreading contagion by chucklers cutting up carcasses in exposed places has been taken notice of in South Canara, where a conviction was obtained, copy of which is attached.* It would be well if such prosecutions were more frequent, as nothing better for the spread of disease can be imagined than the reckless way diseased carcasses are cut up where animals have free access.

St. Thomas' Mount, 1st May 1887. (Signed) J. MILLS, Vety. Surgn., 1st class, Inspector of Cattle Diseases.

Order—dated 25th October 1887, No. 1012, Revenue.

Miscellaneous.

In accordance with the instructions contained in Circular No. 52-G—69-6, dated 14th September 1887, of the Government of India, Department of Revenue and Agriculture, Government do not propose to review the report read above at length, and will merely pass such orders as may seem necessary.

2. His Excellency the Governor in Council agrees with the Board that there ought to be no difficulty in training an Agricultural Inspector to take charge of a travelling show of agricultural implements.

3. The results of the experiments with seed distributed among the districts are discouraging, and the Board should consider whether it would not be advisable in future to entrust experiments of this nature only to such officers as are likely to take an interest in them.

4. No less than 50 per cent. of the cattle attacked with disease during the year died, but neither the Board nor the Inspector of Cattle Diseases have noticed this very large increase in the proportion of deaths to attacks. Nor does the report contain any

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* *Calendar Case No.* 23 *of* 1887.

Regina et India Imperatrix *v.* (1) Keraga, (2) Sinna Keraga, (3) Guruva, (4) Aita.

Offence.—Negligent act likely to spread infection of disease dangerous to life, section 269, Indian Penal Code.

Finding.—Guilty.

Sentence.—Defendants each to suffer to 10 days' simple imprisonment.

Judgment.

The Bantvál police charges the abovenamed persons under section 269, Indian Penal Code, because they opened a carcass of a cow died of rinderpest in a public place, and took away a portion of the meat for their own use, leaving in the spot all rubbish.

The accused admit having opened the carcass in an open place, viz., a paddy field, and taken a portion of the meat for their own use. But they say that they did not know that the animal died of rinderpest. They have no witness to examine on their behalf.

I have examined the three witnesses out of five cited by the police. First witness, Achuta Baliga, says that before giving the carcass to the accused to be buried, he had informed them that the animal had died of rinderpest. Second witness, Potel Manjinath Phrabu, states that he has expressly told the accused and the other Pariahs of the place not to use the meat of the animals died of cattle disease, but to bury the carcass. Third witness, Mr. Santayya, Cattle-disease Inspector, has seen the accused opening the carcass in an open place which is used by the cattle to graze.

Rinderpest is a contagious disease and the meat of the animal died of that disease is dangerous to the health of the persons using it.

The accused have committed an offence either under section 269, Indian Penal Code, or under section 291, Indian Penal Code, and I order that defendants should each undergo 10 days' simple imprisonment for the same.

Bantval, 5th February 1887. (Signed) V. RAMA ROW, Second-class Magistrate.

information regarding the efforts made by local Inspectors to cope with outbreaks of disease. Even the usual returns showing particulars for each district have not been forwarded this year. It is therefore impossible for the Government to form any opinion upon the working of this most important branch of the Agricultural Department. These omissions should be supplied in future reports. Government also desire to impress upon the Commissioner that it rests with him, as head of the department, to see that the local Inspectors do their work efficiently: he can only do this by the exercise of careful and constant supervision.

5. It is to be hoped that the introduction of the new village manual will result in securing greater accuracy in the returns of cattle. This, however, must not be left to chance, but district officers must frequently test the statements submitted by the village accountants, for it is only by constant check that accuracy can be ensured.

6. The experiment in stock, pony-breeding and ensilage should have the continued and close attention of the Commissioner.

7. The matter of the large number of cases of cattle-poisoning which occurred in the Anantapur district should form the subject of further inquiry, and the local Cattle Diseases Inspector of that district should be specially warned to promptly bring before the Magistracy any cases of this nature that may come to his notice.

8. The greater part of Mr. C. Benson's time appears to have been devoted to the preparation of the analysis of the Kurnool district. Apart from this, he supervised two agricultural shows and one travelling exhibition of agricultural implements; he visited the Karúr and Madura farms and the settlement at Whitefield; and he inspected two localities proposed as sites for a stock depôt. It will be seen that unless his duties in connection with the Kurnool analysis were very heavy, the work in his particular branch of the department is far from onerous. The results of the Kurnool analysis have not yet been submitted to Government, so they are not at present in a position to judge whether Mr. Benson's time was fully occupied or not; but as the district analysis work will be much lighter in future, they are unable to concur in that officer's opinion that it is "very evident that the growing work of the department is more than one officer can properly attend to."

(True Extract.)

(Signed) J. F. PRICE,
Ag. Secretary to Government.

To the Commissioner of Revenue Settlement, Land Records and Agriculture.
" Commissioners of Land Revenue.
" Government Botanist.
" Editors' Table.

No. 1012-A.

Copy to the Government of India, Revenue and Agricultural Department.

(Signed) J. F. PRICE,
Ag. Secretary to Government.

Resolution—dated 24th December 1887, No. 537.

Communicated to the Inspector of Cattle Diseases and to all Collectors whose attention is called to paragraph 5 of the Government Order.

2. The Collector of Anantapur is requested to report on the subject of paragraph 7 of the order and to issue the necessary instructions to his local Cattle Disease Inspector.

3. The instructions in paragraph 3 of the order have already been followed to a great extent during the current year.

4. With reference to paragraph 4 of the order, the Board beg to state that in previous years the statistics of cattle diseases and mortality furnished in the Director's report were obtained from returns compiled by the Inspector of Cattle Diseases. In

the year under review an attempt was made to check these returns with the figures given in the Collectors' administration reports for 1886-87 and it was found that the statistics were wholly unreliable. According to Mr. Mills' returns the total number of deaths of cattle from all causes was 144,160, while according to the Collectors' administration reports it was 287,204. Differences were observed in every district and the Board thought it useless to give any details for districts under such circumstances. In the current year the local Cattle Disease Inspectors have been placed under the immediate orders of Collectors, and arrangements have been made for the compilation of the statistics in the Board's office instead of in that of the Inspector of Cattle Diseases. The local Inspectors are now carefully supervised in most of the districts and their movements are reported to the Board every week in a footnote appended to the post copy of the weekly season reports sent by Collectors. It seems hopeless, however, to expect that one local Inspector with a whole district as his range will be able to cope successfully with outbreaks of cattle diseases in different parts of the district.

(A true Copy and Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

(True Copy.)

(Signed) M. ADINARAYANA IYAH,
First Assistant.

To the Secretary to Government, Revenue Department.
,, all Collectors.
,, the Inspector of Cattle Diseases.

Exd. W. J. Lewis.